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Reports

State of Colorado

— of the —

State Engineer

(C. B. CRAMER)

— for —

1893, 1894



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Seventh Biennial Report

OF THE

STATE ENGINEER

TO THE

Governor of Colorado

FOR THE

Years 1893 and 1894

PART I



DENVER, COLORADO
THE SMITH-BROOKS PRINTING CO., STATE PRINTERS
1895

1893-1894

Letter of Transmittal.

To His Excellency,

DAVIS H. WAITE,

Governor of Colorado:

I have the honor to transmit herewith the official report of the operations of the Department of the State Engineer during the two fiscal years ending November 30, 1894.

Respectfully submitted,

C. B. CRAMER,

State Engineer.

Denver, Colorado, December 1, 1894.



STATE ENGINEER'S REPORT.

DEPUTY STATE ENGINEER.

Owing to the fact that this office contains so much data and numerous records of matter in which many people of the state are interested, there also being a great number of records of ditches, reservoirs, artesian wells and the reports of the superintendents of irrigation to file, as well as attending to "certified copies" of the different records, I have found that it requires the time of the deputy state engineer to answer the correspondents and to furnish the information required.

DEPUTY STATE GAUGER.

I have instituted a new feature in this report in making a special department for the work of this officer. A careful examination of his report will show the great importance of this office and should induce the legislature to make an appropriation in some measure commensurate with the work.

Upon assuming the duties of this office I was beset with letters of inquiry regarding the irrigation laws of the state, and so numerous were these requests for this information that it was deemed advisable to publish a compilation of them in as compact a form as possible. Under the title of "The Irrigation Laws of Colorado," this was accordingly done. The necessity for this work is shown by the extensive demand which has come for it from all parts of the United States.

THE WATER SUPPLY.

The total area of the state is about 66,560,000 acres. The average precipitation for the past twelve

years was about twenty-one inches per annum, which gives us the enormous quantity of 117,240,000 acre feet of water.

About 45,000,000 acre feet is precipitated on the mountain lands on the western slope of the continental divide; 8,490,000 acre feet on the mesa and valley lands of the same slope; 25,500,000 acre feet on the mountain lands of the eastern slope, and 38,250,000 acre feet on the mesa and valley lands of the latter slope.

In the mountain lands about thirty-three per cent. of the total precipitation is lost. either by evaporation or filtration and absorption.

In the mesa and valley lands about eighty-five per cent. of the precipitation is lost. Applying this percentage of loss to the waters falling on the mountain lands of the western slope and there will yet remain 30,000,000 acre feet as the available water supply for irrigation from these lands alone.

Add to this 1,414,500 acre feet, the quantity available from the mesa and valley lands, and it gives a total of 31,414,500 acre feet for the irrigation of the western slope.

Upon the eastern slope of the divide the conditions are not so favorable, the available supply from the mountains being only 17,000,000 acre feet, that from the plains, 5,737,500 acre feet, making a total of but 22,737,500 acre feet and giving a grand total for the state of 54,152,000 acre feet.

Naturally these averages will vary with the different years, but it is not probable that the available supply will ever fall below 35,000,000 acre feet.

IRRIGABLE LANDS.

I do not know that the exact acreage of the lands of Colorado has ever been computed, but the following will be found a close approximation:

Total area of land in state	66,560,000 acres
Area of mountain lands	26,560,000 acres
Area of mesa and valley lands	40,000,000 acres

This land may again be divided as follows:

WEST OF CONTINENTAL DIVIDE.

Area of mountain lands	16,360,000 acres
Area of mesa and valley lands	9,400,000 acres

EAST OF CONTINENTAL DIVIDE.

Area of mountain lands.....	10,200,000 acres
Area of mesa and valley lands.....	30,600,000 acres

Of these mesa and valley lands, probably over one-half are irrigable, while less than five per cent. are at present under cultivation.

DUTY OF WATER.

The duty of water is the ratio between a given quantity of water and the amount of land it will irrigate. It is commonly expressed as the number of acres of land that one second foot of water will irrigate, or as the number of acre feet of water required to irrigate an acre of land.

This duty of water may be considered under two heads, viz.: net duty and gross duty.

Net duty would represent the duty of water upon its direct application to the land.

Gross duty represents the duty of water as taken from the natural stream. The net duty varies with different soils, the crops, the modes of applying it to the lands and the height of the sub-surface water-plane.

SOIL.

Soils vary in kind and in depth. A shallow adobe soil usually requires one second foot of water to irrigate 160 acres of cereals. For deep and light loamy soils the duty at first is rarely over fifty acres of cereals, but it gradually rises until it reaches 160 acres and sometimes over 200 acres. A deep sandy soil requires at first a second foot of water for about thirty acres of cereals, but this duty rises rapidly to 160 acres and often 300 acres. These figures are all based on surface irrigation three inches deep of a crop of cereals, watering to be repeated as soon as soil dries to a depth of sixteen inches, which may be assumed as a standard irrigation.

The depth of soil is usually limited by an impervious sub-strata of clay, which is found at depths varying from one (1) foot to thirty (30) feet, the average being about ten (10) feet. Upon the depth of this sub-strata and upon the compactness of soil depends level of the water plane, or top of the sub-surface waters. This water plane gradually rises as the soil is filled by the waters from irrigation until within four or five feet of the surface.

Modes of applying water to lands:

First—Flooding—Absorption downward—This system of irrigation comprises all plans where the whole surface of the ground is covered with water, which is gradually absorbed by the soil below.

Second—Ditching—Lateral absorption—The water is carried over the land in more or less numerous ditches and allowed to soak the ground in all directions.

Third—Sub-surface irrigation—Water carried to the land in pipes at a depth of eighteen or twenty-four inches below the surface.

CROPS.

There is a great difference in the amount of water which different crops will use, some kinds requiring water from early spring to late in fall, and others only one or two months in middle season.

THE GROSS DUTY OF WATER

Is affected by evaporation and filtration, these depending in turn upon the size of the ditch, its age and the materials of which it is made.

Evaporation—From the many experiments made, the amount of evaporation may be figured with comparative accuracy. In the valleys of Colorado it will be found to be a trifle less than two-tenths of an inch daily during the months of May, June, July, August and September. For the other seven months it will not average over five one-hundredths of an inch daily.

Percolation—This varies from about two inches to thirty inches in depth of water daily, according to

soil over which it passes. The mean rate in a sandy soil is nearly nineteen inches daily; the rate for a light loam is about ten inches daily, while a clayey soil will not allow over two inches to pass through it daily.

SOURCES OF WASTE.

First—Duplication of ditches—Reference to the district ditch maps prepared by this department will show many ditches paralleling one another, thus exposing, uselessly, great surfaces of water to evaporation and absorption. Probably sixty per cent. of the waste chargeable to these two causes could be saved by carrying all the waters in a few large ditches.

Second—Unskilled irrigators—Hired or transient labor can never attain the skill in irrigating that a permanent resident can, but a farmer will not spend money for labor if he can succeed with less labor and more water.

Third—Too wide distribution—By attempting to deliver water at widely distributed points great quantities are lost by evaporation and absorption, which latter in some cases is so great in the bed of a stream as to drink up every drop of a fair sized stream.

Fourth—Canals not properly built—One of the common errors in the construction of a canal is the utilizing of depressions along the line as part of the channel; that is, in crossing an arroyo only the lower bank is built up and the water allowed to spread out in a large pond. In these cases the losses by evaporation and absorption are greatly increased. Canals built through a soil of extreme porosity often lose over fifty per cent. of the water carried.

Fifth—Irrigation of pasture lands—Farmers often turn large streams of water over their pasture lands, keeping it flooded for a whole season, causing the largest possible loss from evaporation and percolation.

Sixth—Domestic purposes—It is a question whether the law giving the preference to those using water for domestic purposes does or does not carry with it the privilege of diverting this water from the

natural stream and conducting it for a long distance through an otherwise dry channel. If it does, the mere use of this privilege during a dry time would entirely obliterate all chances of making crops in many of the smaller farming districts, and might be abused to such an extent as to ruin most farmers on the eastern plains of Colorado.

EARLY IRRIGATION.

The following letter and the subjects contained therein are self explanatory:

Denver, Colo., December 6, 1894.

Mr. C. B. Cramer, State Engineer, Denver, Colo :

Dear Sir—Respecting the loss of water by seepage when water is turned into the canals at the beginning of the season in the spring, it is my opinion, based upon some considerable observation and experience, that for the first week under average conditions there is a loss of twenty-five per cent. Where the sub-soil is porous and the water is free from sediment, a large share of this loss continues for an entire month, possibly. Where the sub-soil is clay and the canals have been run for a year and the water contains a large per cent. of sediment, as in the Arkansas river and certain of the canals in the Arkansas valley, the percentage of loss after the first two or three days would not be ten per cent.

It is very important, therefore, where the supply of water is short, that the water be turned in the canals as early as possible. This is also important in those districts where sub-irrigation exists, as, for instance, in the San Luis valley. These estimates apply to canals of twenty feet in width on the bottom and upward. The loss, of course, is very much greater in smaller ditches and in laterals, and in a small, freshly-made lateral the percolation and seepage would quite equal that of a like area in an open field.

If water was turned into the canals and laterals by the middle of March, the land would become saturated and sub-irrigated so that flooding would be unnecessary, and should there not be sufficient rainfall to germinate the crops, sub-irrigation would accomplish that result early enough in the season to mature the crop thoroughly.

Last year thousands of acres of small grain in certain sections of the San Luis valley, where sub-irrigation prevails, were almost wholly lost because the individual acreage was so large, the period of seeding so prolonged, the rainfall so slight, that the grain was not germinated. The farmers were not prepared to flood the land, and the interval between the time of seeding and the sub-irrigation effects was so great that the grain was started altogether out of season. Had the farmers turned the water into the ditches and laterals as early as possible in

the spring, the land would have been sub-irrigated in time to have brought up the grain and maintained its unchecked growth.

I think you cannot incorporate in your forthcoming report a more important injunction than that the farmers of Colorado should start the water in their ditches early, when there is always a supply in the streams.

Very respectfully,

T. C. HENRY.

The constitution of the state declared "the waters of every natural stream" "to be the property of the public," but "subject to appropriation, as hereinafter provided." It dedicates these waters "to the use of the people of the state," and under this clause the statutes should so dictate that the highest and most beneficial use of this water shall obtain. The privilege of appropriating water is not a property right, and carries with it an obligation to the state which should demand from appropriators such use of the common stock as shall most benefit the whole people.

It should at all times be remembered that the demand must constantly increase, and the common weal is best served by distributing the supply to the largest number of consumers who can utilize it to the greatest advantage and with the least possible waste.

Excessive decrees are quite common, having often been awarded for eight or ten times the amount the ditches will carry, and probably half the water taken by such ditches is wasted; or worse yet, it is used so plentifully on the land as to drown crops, deteriorate the land and render the place unhealthy. Yet those who hold these decrees will each year enlarge their ditches, while ostensibly cleaning them, thinking that by limiting the supply they decrease competition, or that they may in the future be able to sell the water they have unjustly appropriated.

There is a statute forbidding the running of excess water through ditches, but, as it does not define the amount that may be used, it has not been enforced. The Spanish law, which allots five-tenths of a litre to each hectare of land, equal to one second

foot for 140 acres, would be a great advance and save an enormous amount of water now wasted. The law should also require that each appropriation should be made to a certain tract of land, and such land should be fully described in the filing, and whenever such land is not cultivated the water right should be forfeited.

INTERNAL IMPROVEMENT FUND.

The state has a large fund for internal improvements, and I know of no undertaking that would build up the state faster or increase the taxable wealth more than to use that fund in building large storage reservoirs and supply canals in different parts of the state. Particularly should this fund be made to enhance the value of the school lands, as then each dollar so spent will benefit all portions of the state. It would seem that the exclusive use of this fund for such purpose would be advisable.

STATE LANDS IN RIO GRANDE AND SAGUACHE COUNTIES.

The state sold to certain parties each alternate quarter section of its lands, or a portion of them, and a part of the consideration of said sale was that the said parties should furnish water for the land retained by the state. Complaints are frequently made that water has not been furnished for use of occupants of state lands. Steps should be taken, by legislation or otherwise, to compel the fulfillment of said agreement or the forfeiture of lands so sold.

Chapter II.

IRRIGATION DIVISION No. 1—SOUTH PLATTE DIVISION.

Hon C. B. Cramer, State Engineer, Denver, Colo.:

Dear Sir—I have the honor herewith to submit my report of water division No. 1 for the years 1893 and 1894. My appointment dates from July 18, 1893, at which time I found the office in excellent condition, and through the kindness of my predecessor, I. H. Batchellor, I was given much aid to the duties of my office.

The irrigation season of 1893 was a very unfavorable year with farmers throughout many districts of my division, few ditches antedating 1870 being allowed to draw water for any length of time and but little rain falling throughout the season. The average yield was about two-thirds of a usual crop.

The season of 1894, on the other hand, has been one of the most prosperous in the history of the division. While there was a scarcity of water at the beginning of the season, with less than a normal amount of snow on the head-waters of many of the streams, the prospects looked gloomy; but the copious rains of the last few days of May and June and the first part of July, in the mountains and along the foothills for some forty or fifty miles to the eastward, furnished an abundance of water for irrigation.

District No. 1—S. D. Shumate, commissioner district No. 1, reports 26,329 acres irrigated during the season of 1894, fifty-six per cent. of the amount being

hay and grasses. The cost of superintendence of the ditches was \$1,439, and the cost of repairs \$3,300.

District No. 2—J. H. Hodgson, commissioner district No. 2, reports 47,758 acres irrigated in 1893, with trict No. 2, reports 47,758 acres irrigated in 1893, with ports for year, \$7,285. For 1894 there were irrigated 47,386 acres, a decrease of 372 acres, with cost of superintendence and repairs \$16,744. Mr. Hodgson says that "The heavy cost of repairs for the year are due to the damage done by the freshet of June. The data concerning cost of repairs and superintendence were, with the exception of two cases, cheerfully furnished." He reports less water coming into the district in 1893 than he ever knew before. Mr. Hodgson, in 1894, made a house to house canvass of his district and the accuracy of his report is highly complimentary to his efforts.

District No. 3—R. Q. Tenney, commissioner district No. 3, reports 332 1-2 miles of ditches in his division, with nine ditches carrying water in 1893 1,077 days in the aggregate.

Total number of acres irrigated in 1894, 177,808; total number irrigated from seepage, 22,024 acres.

Number of acres of alfalfa, 29,183; other grasses, 4,922 acres; other crops, 76,279 acres; pasture and waste, 61,630 acres; wheat, 671,127 bushels; oats, 306,734 bushels; barley, 60,146 bushels; corn, 29,351 bushels; potatoes, 1,410,728 sacks; fruit, 592 1-4 acres.

Cost of superintendence for 1893 and 1894, \$17,502.86; cost of repairs for all the ditches that furnished superintendents, \$52,472; total cost of operating the ditches per acre, thirty-nine and one-quarter cents (.39 1-4).

Reservoirs are becoming an important factor in irrigation throughout this division, for many large ones have been constructed and are in process of construction in districts No. 9 and No. 3, but as no reports have been made by many of the commissioners, I have no data to work from.

The accompanying full report of commissioner for district No. 3 will permit R. Q. Tenney, commissioner for same, to speak for himself:

Fort Collins, Colo., December 15, 1894.

To William N. Bachelder, Superintendent of Irrigation in Division No. 1:

Dear Sir—I hereby submit my report for 1894. The conditions existing in district No. 3 are, we may judge from the number of suits in the courts, more complex than in any other district of the state. The small rain and snow fall in the spring of 1893 and 1894 caused a demand for water for early use never before equalled in this locality. The duties of this position have required the constant attention of the commissioner from early in April, 1893 to the present, and we hazard the assertion that in the future whoever serves the people in the capacity of water commissioner will find it no sinecure, at least in this district. The records of this office which were turned over by my predecessor were a copy of the decree of the district court given by Judge Elliott in 1882. Whatever other information was desired had to be sought for from some other source. We found the several reports from the state engineer's office of much value, and we are under many obligations to Professor L. G. Carpenter, in charge of the experiment station, for courtesies shown from time to time.

Your office has been advised of the complications which have presented in this district, but we deem it proper at this time to mention a few cases that have more than a local significance. The first one we had to deal with was the case where Ex-Governor Routt had built a ditch from the river and heading about two miles in the canon. This ditch was constructed at an expense of, as he states, \$18,000, and to cover land of which he was the principal owner. It seems to have been the custom of my predecessors to allow the new ditch to take water which had been decreed to an old ditch, much in excess of its needs, and of which Mr. Routt owned eleven-twelfths. According to previous custom, the managers of this "Poudre High Line Canal," on the 5th of April, 1893, turned in what water they wanted. The rights of this ditch never having been determined by any judicial act, and it being the junior ditch on the river, I refused to allow it water until those ditches which had decrees had enough to supply their needs, whereupon Governor Routt filed a complaint with Judge Allen of Denver, and asked the court to order the water commissioner to turn into his ditch four cubic feet of water and to let it run until further orders from the court. Whether this action was just or not, your servant, the commissioner, did not see fit to contest the rights of Governor Routt, and the water was allowed to flow in this ditch until one of the old appropriators, in a suit brought in the district court, had the order set aside on the seventh of the present month.

Within the past two years many of the large ditches have reconstructed their headgates and rating flumes, some of which were in a very bad condition. Among these may be mentioned the Larimer and Weld and the Union Colony No. 2. The latter now has the most complete and substantial headworks in this district. A large amount of work has been done on the P. V. and Lake, the New Mercer, the Larimer County No. 2 and the Larimer and Weld. Some of these have never been able to carry the full appropriation as decreed by the court.

The development of storage reservoirs has been pushed vigorously, and the results from water so stored have been satisfactory in the highest degree. There is yet opportunity to increase this benefit, and it has been my purpose to urge upon those in whose power it lies to avail themselves of these opportunities. The reclamation of wet lands and the utilization of the water so procured has been carried to quite an extent. These reclaimed lands proved to be the most productive of any, and are used mostly for truck gardening. There is a fruitful field for some enterprising party to step in and, with improved machinery, do a great work for the farmers of this valley and "put money in their purse" at the same time.

I cannot omit mention of the enterprise inaugurated by The Water Supply and Storage Company, whereby the water from the Laramie river has been brought over the divide and turned into this district. This company has constructed a ditch in the mountains at an elevation of ten thousand feet, a length of something over five miles, and at a cost of \$75,000. The construction was begun the season of 1892, and the water was turned from the Laramie river July 4, 1894. They were able to run during July about one hundred cubic feet per second, and the ultimate capacity will be about three hundred feet. They expect to be able to run water the entire winter, and at this writing are running twelve feet per second. This company being junior appropriators, their supply from the Poudre was exhausted generally by the twentieth of June. By the use of this additional supply the farmers under the Larimer County ditch have been able to mature and secure their entire crop this year, something that has been impossible heretofore, with one or two exceptions. The management of The Water Supply and Storage Company are entitled to great credit for their persistent efforts in this new enterprise. The storing of this water at such times as it is not needed for immediate use will enable the company to farm a larger area under their canal, which is seventy-two miles long, extends to and beyond the Denver Pacific Railroad, and covers some of the finest land in Northern Colorado.

Irrigation by pumping has as yet not proven a success. But few experiments have been tried, and these have been in a rather primitive way. We look for further developments in this line, and it may prove successful when the work can be done at a minimum cost.

The automatic electric indicator, which was placed by Professor Carpenter at the weir in the early part of June, although not in time to benefit the district as much as could be wished, demonstrated that it was practicable, and confirms the belief that the same appliance should be put in in every important district in the state. Professor Carpenter and his assistants are entitled to the thanks of every farmer in the valley for their untiring zeal and interest shown in their behalf.

The telephone line, under the management of the water commissioner, has proven of inestimable value, and we can hardly conceive how it could be dispensed with. The cost of repairs and maintenance of the twenty-five miles of line has been about \$125, which amount has been paid by the two counties of Larimer and Weld. I would suggest that the state engineer embody among his recommendations that the law be so amended that any and every water district may be allowed to construct and maintain, for the benefit of the district, a telephone line or lines. Under proper restrictions these lines might be made to return a revenue sufficient to maintain them. The law should be so framed that a tax might be levied by the county commissioners to raise a fund to construct and maintain substantial wiers at proper points on the river, which would enable the commissioner to distribute the water in the district with greater efficiency and consequently less loss.

The flow of water in the Poudre has been recorded at the wier in the canon by an automatic register, and has been under the control of Professor Carpenter. The register was placed April 14 of this year, and has worked perfectly until within the past ten days. This record is in the hands of Mr. Trimble, who is assistant to Professor Carpenter, and will be transmitted to your office when the proper deductions are made. The changing conditions of the river, and the ditches as well, have made it necessary to make frequent ratings of all the large ditches, the jealousy between all the large appropriators being so strong that they demanded a close supervision over these ditches, and rendered a frequent rating necessary to quiet the suspicions of fraud.

On the 12th of July, in company with Mr. Preston, the state gauger, we started for the head waters of the Poudre and Laramie rivers. On the 13th we gauged the Big South at its confluence with the main stream. On the 14th we gauged the Laramie at the head of the newly constructed ditch, finding one hundred and fifty feet of water per second. On the 15th we rated the outlet of Chambers Lake, which included Fall river, Joe Wright creek and Trap creek. The 16th and 17th we made several ratings of the Laramie River ditch. The 18th we drove down the Laramie to the state line. On the 19th we rated the Laramie at Mr. Bliler's, one-half mile above the state line. The 21st found us back in Fort Collins, after a trip of ten days and about two hundred miles travel. The results of our observations will be embodied in Mr. Preston's report. On the 17th of July water was turned out of the Windsor reservoir, which is auxillary to the Lari-

mer and Weld canal. This work was begun under the supervision of Mr. L. P. Witham, as deputy. This work was completed August 19th, and was continuous except for a few days. The water stored in this reservoir was 221,498,755 cubic feet, and was discharged into Union Colony No. 2, in exchange for the same amount taken into the Larimer and Weld canal.

The Larimer and Weld reservoir, which is one and one-half miles due north of Collins, was first drawn from July 28, at which time 25,740,000 feet was discharged into the Larimer and Weld canal. The second draught was made on the 19th of August, when 106,326,000 feet was drawn. On September 13 the last run was made of 172,288,680 feet, or a total of 304,354,680 cubic feet. This amount was distributed pro rata among the stockholders in the Larimer and Weld canal. The conservation of the surplus or flood water of this district is destined to place this valley in the van of any agricultural district in the state.

The Water Supply and Storage Company, formerly The Larimer County Ditch Company, had about 150,000,000 feet of stored water, which was exchanged with ditches having old priorities, but the record of this was not kept with the exactness of the before mentioned.

The results of this season's work will be more fully set forth in my tabulated report of acres irrigated and total yield. In the fall of 1893 I sent out over a thousand printed blanks, and asked that they be filled in and returned for compilation. About 7 per cent. of these were returned—not enough to formulate into a report.

This fall we placed deputies in the field, with instructions to see every person who farmed an acre of ground and get all the information possible concerning his products. The work is nearly completed at this writing, and when compiled will show the most complete statistics that have ever been gathered in this or any other district in the state.

The work of this office has been somewhat circumscribed, owing to the fact that our county commissioners do not seem to comprehend the scope or importance of it, they refusing in some instances to allow the bills for expense of necessary assistants, and this in the face of the fact that the objectors were, or claimed to be, practical farmers. As a whole the affairs of this office have gone on smoothly. While there was some dissatisfaction on the part of some of the junior appropriators, the results of the season's work go to prove that a rigid adherence to the decree of the court is the only just and equitable course to pursue.

Very truly, etc.,

R. O. TENNEY,

Commissioner for District 3, Division 1.

District No. 4—W. H. Laws, commissioner district No. 4, gives no crop statistics for either year. He reports that the ditch superintendents failed to fill out blanks sent for the purpose of gathering the data and that the district is so large that he must depend upon them for the desired information.

District No. 5—J. W. Daniels, commissioner district No. 5, reports 63,870 acres irrigated during the season of 1893. Mr. Daniels' report for 1894 will not admit of comparison with former years, as he does not report fully on all crops. He gives the number of fruit acres irrigated in his district as 1,955 acres, and of potatoes, 1,637 acres. The number of acres of alfalfa irrigated in 1894 shows a decrease of about thirty-three per cent. over that of 1893. The cost of repairs and superintendence of ditches could not be ascertained.

District No. 6—A. C. Stillwell, commissioner district No. 6, reports the number of acres irrigated in 1893 as 74,779; the number of acres irrigated by seepage, 1,400. For the season of 1894 there was practically no change in the number of acres irrigated. The cost of repairs and superintendence was \$10,220; the number of acres irrigated from storage was 5,800. Mr. Stillwell thinks that only about two-thirds of the water of the stream was utilized during the irrigation season of 1894. The floods did great damage to headgates and other property. He adds that there is a great tendency among the farmers of this district to diversify their crops within the last two years.

District No. 7—George R. Arnold, commissioner district No. 7, reports for 1893 the number of acres irrigated from ditches, 49,329, and 1,820 acres from seepage; number of acres that can be irrigated, 95,720. He served from May 10 to November 18, being on duty 254 days; deputy served ninety days; for 1894 he reports about the same number of acres as in 1893, with twenty per cent. better run of water in ditches than in 1893.

District No. 8—S. F. Couch, commissioner district No. 8, gives 21,583 acres irrigated in 1893, with a cost of repairs and superintendence of \$32,637. The number of acres of fruit irrigated was 2,651. In 1894 there were irrigated 20,139 acres, a decrease of 6.7 per cent. over 1893. Cost of repairs and superintendence for year, \$22,522. The operating expenses for Mr. Couch's district for the two years were respectively \$1.47 and \$1.12 per acre irrigated.

District No. 9, Frank Ewers (appointed) and J. A. Van Gordon (appointed) commissioners district No. 9, report 4,554 acres irrigated from ditches and 5,555 acres from reservoirs in 1893. Cost of repairs and superintendence, \$1,838. For 1894, 4,707 were irrigated from ditches and 5,630 from reservoirs, showing an increase of a little over two per cent.; the cost of repairs and superintendence being \$3,995.

District No. 23—L. Hall, commissioner district No. 23 reports 76,332 acres irrigated in 1893, with cost of superintendence, \$382.50. In 1894 there were irrigated 78,058 acres, a gain of two per cent. over the previous year.

District No. 46—No report.

District No. 47—W. D. Beckwith, commissioner district No. 47, reports 18,695 acres irrigated in 1894. He says that many of the ditches on the larger streams are using two to five times the amount their decrees call for. He served from June 20 to August 1.

District No. 48—No report.

District No. 64—R. J. Patterson, commissioner district No. 64, gives 13,075 acres irrigated in 1893, and cost of repairs and superintendence, \$4,252. There were irrigated in 1894 18,237 acres, an increase of thirty-nine per cent. over 1893. The cost of repairs and superintendence was \$4,905. Mr. Patterson reports a very dry season, with water very scarce in the early part of the season. Crops were generally poor except alfalfa.

District No. 65—No report.

With many thanks for the kind assistance you and your deputies have rendered me in the discharge of my duties,

I am yours with respect,

WM. N. BACHELDER,
Superintendent Water Division No. 1.

REPORT OF CROP STATISTICS IN DISTRICT NO. 3, DIVISION NO. 1—1894.

CANALS OR DITCHES	Total Acres	Alfalfa Acres	Other grass Acres	Other crops Acres	Pasture and waste Acres	Wheat Bushels	Oats Bushels	Barley Bushels	Corn Bushels	Potatoes Sacks	Fruit Acres
North Poudre Canal	9,074	843	795	2,430	7,081	41,731	20,102	1,793	3,775	5,687	3
Larimer County Ditch	27,844	4,010	-----	12,847	11,131	89,774	23,855	7,209	4,075	113,795	35¾
Larimer and Weld Canal	59,597	7,428	878	32,182	15,123	283,998	89,004	17,599	6,702	554,303	53¾
Pleasant Valley and Lake Canal	8,221	1,750	470	2,234	3,110	7,338	11,578	830	1,972	3,655	123
New Mercer Ditch	4,256	1,664	174	1,020	1,867	17,999	21,941	8,075	2,032	13,448	101½
Larimer County Canal No. 2	8,623	2,751	61	2,680	985	34,881	14,190	7,120	280	10,389	70¾
Fort Collins Canal	1,179	492	45	387	374	720	799	425	65	860	33
Dry Creek Ditch	3,160	1,131	223	453	991	1,989	3,257	-----	-----	350	41¾
Little Cache la Poudre Canal	1,300	567	61	642	204	1,544	2,033	-----	-----	1,420	24½
Taylor & Gill Ditch	464	159	9	174	164	-----	300	175	100	1,350	28½
John R. Brown Ditch	290	60	75	70	85	-----	490	-----	-----	-----	5
From seepage	-----	62	115	433	450	2,700	6,245	2,435	1,530	8,050	4
Canon Canal	497	160	5	90	197	250	120	57	300	500	5
Watrous, Wheedbe & Second Ditch	120	20	-----	25	75	-----	-----	-----	-----	600	-----
Box Elder Ditch and Res. Co.'s Ditch	1,280	50	-----	100	1,000	900	300	-----	25	200	-----
Josh Ames Ditch	460	24	50	110	276	1,600	516	1,100	150	1,400	-----
City Ditch	26	3	-----	3	20	-----	-----	-----	-----	-----	-----

Lake Canal	6,242	1,007	156	1,762	2,076	19,900	15,516	1,282	3,855	23,280	10½
John G. Coy Ditch	300	60	80	45	115	260	240	---	75	620	---
Pioneer Ditch	682	260	50	55	442	240	1,700	---	---	1,000	2
Box Elder Ditch	1,735	270	144	351	1,028	1,077	1,467	634	95	3,184	---
Cache la Poudre Irr. Co.'s Canal No. 2	33,173	5,032	704	15,065	11,128	144,224	82,628	9,837	3,670	602,485	42½
Whitney Ditch	2,080	358	55	652	683	4,410	6,051	---	100	17,500	3¾
B. H. Eaton Ditch	---	---	---	---	---	---	---	---	---	---	---
Cache la Poudre Irr. Co.'s Canal No. 3	1,275	147	103	517	480	1,875	1,140	---	---	14,652	---
Wm. R. Jones Ditch	360	75	119	135	149	300	1,600	---	250	2,240	1
Boyd & Freeman Ditch	900	90	350	300	158	---	1,575	1,575	300	7,000	2
Ogilvy Ditch	3,800	720	---	1,357	1,728	13,290	7,465	---	---	29,660	---
Hoover Ditch	960	90	200	160	510	127	622	---	---	3,000	---
Grand totals	177,808	29,183	4,922	76,279	61,630	671,127	306,734	60,146	29,351	1,410,728	592¼

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 1, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, S. D. SHUMATE.

NAME OF DITCH OR CANAL.	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Enterprise Ditch	Middle Bijou	Jan 26, 1893	Oct. 30, 1892	6.60	Clark Morrow
Underflow Extension of Kiowa Ditch	Kiowa creek	Feb. 16, 1893	Nov. 20, 1893	10.70	W. R. Askew
Blanchard & Ferris Ditch	Bijou creek	Mar. 8, 1893	Mar. 6, 1893	100.00	Nat G. Blanchard and Chas. A. Ferris
Drury Ditch	{ Seepage, flood and } waste waters of Coal creek	April 10, 1893	Jan. 5, 1893	235.32	Daniel A. Canfield
Coal Creek Ditch	{ Seepage, flood and } waste waters of Coal creek	April 10, 1893	Jan. 5, 1893	235.32	Daniel A. Canfield
Huston Ditch	Running creek	May 16, 1893	Feb. 20, 1893	5.00	Henry J. Huston
Bijou Valley Ditch	Bijou creek	Sept. 20, 1893	Sept. 4, 1893	100.00	{ Rollan Sherman, John B. Probst and A. M. Fahringer.
Weldon Valley Seepage Ditch	Waste and seepage	Sept. 21, 1893	Aug. 30, 1893	77.00	Weldon Valley Seepage and Irrig. Co.
Moore Ditch	Deer Trail creek	Nov. 24, 1893	Nov. 6, 1893	2.45	E. K. & J. I. Moore
Canfield Supply and Storage Ditch	Crow creek	Jan. 2, 1894	Aug. 15, 1893	100.00	Daniel A. Canfield
Sterling Drainage and Seepage Ditch	South Platte	Jan. 3, 1894	Dec. 8, 1893	28.00	Asa Sterling
Donovan Ditch	Crow creek	Jan. 16, 1894	Jan. 9, 1894	.50	George G. Donovan
Johnson & Edwards Ditch	South Platte	Jan. 29, 1894	April 10, 1886	66.83	Bruce F. Johnson and W. H. Edwards

Sheesly No. 1 Ditch.....	Porter creek.....	Feb. 9, 1894	Nov. 24, 1893	11.20	George P. Sheesly
The Brown-Hyott Canal.....	South Platte.....	Feb. 21, 1894	Mar. 1, 1882	10.00	Horace G. Hyott
McDonnell Ditch.....	West Bijou creek.....	Feb. 27, 1894	Dec. 18, 1893	23.70	Leonard McDonnell
Schultz Ditch.....	South Platte.....	Mar. 2, 1894	April 1, 1888	25.00	W. C. Schultz
Mary Lawless Ditch Enlargement..	West Bijou.....	Mar. 20, 1894	Dec. 23, 1893	450.00	Mary Lawless
Fred Buchmann Ditch No. 1.....	Kiowa creek.....	April 6, 1894	Mar. 1, 1870	23.00	Fred Buchmann
Fred Buchmann Ditch Nos. 2 and 3..	Kiowa creek.....	April 6, 1894	July 3, 1882	25.00	Fred Buchmann
Oaks Ditch No. 1.....	Kiowa creek.....	April 7, 1894	1866	.045	Joseph Oaks
Oaks Ditch No. 2.....	Kiowa creek.....	April 7, 1894	1868 or 1869	.045	Joseph Oaks
Pooler Ditch Nos. 1 and 2.....	East Bijou.....	April 11, 1894	Sept. 1, 1893	24.00	Charles E. Pooler
Mackly Ditch.....	Crow creek.....	April 12, 1894	Mar. 10, 1894	3.00	John B. Mackly
Mining Ditch.....	Spring creek.....	April 17, 1894	Feb. 15, 1894	8.00	Moses Minning
J. R. De Remer Ditch.....	Dry creek.....	May 7, 1894	April 1, 1894	40.00	J. R. De Remer
Drury Ditches.....	Crow creek.....	June 11, 1894	-----	-----	The Drury Land and Irrigation Co.
The Lone Tree Ditch.....	Lone Tree creek.....	June 11, 1894	-----	-----	The Lone Tree Ditch and Lateral Co.
Hudson City Ditch, Amended.....	Box Elder creek.....	July 14, 1894	April 17, 1894	330.00	Hudson City Ditch Co.
The Sand Arroyo Ditch.....	Sand Arroyo creek.....	Aug. 18, 1894	Dec. 12, 1889	-----	James W. McCreery
Smisserat & Query Ditch.....	Storm and seepage.....	Sept. 25, 1894	Aug. 4, 1894	10.00	Jacob H. Smisserat
Thompson Ditch.....	Gerry creek.....	Oct. 24, 1894	Oct. 11, 1894	3.85	Cornelia Thompson
Box Elder Waste, Flood and See- page Ditch.....	Box Elder creek.....	Nov. 23, 1894	Sept. 11, 1894	21.00	Asa Sterling

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 1, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. H. HODGSON.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Enterprise Reservoir	Middle Bijou creek	Feeder to same	Jan. 26, 1893	Oct. 30, 1892	2,295,786	Clark Morrow
Underflow Ex. Kiowa Reservoir	Kiowa creek	Kiowa ditch	Feb. 16, 1893	Nov. 20, 1893	6,804,300	W. R. Askew
Blanchard & Ferris	Bijou creek	{ Blanchard & Ferris ditch }	Mar. 8, 1893	Mar. 6, 1893	2,200,000	{ Nat. G. Blanchard and Chas. A. Ferris }
Coal Creek	Coal creek	Coal Creek ditch	April 10, 1893	Jan. 5, 1893	83,000,000	Daniel A. Canfield
Canfield Reservoir No. 3	Crow creek	Feeder to same	May 15, 1893	May 1, 1893	324,000,000	Daniel A. Canfield
Huston Reservoir	Running creek	Huston ditch	May 16, 1893	Feb. 20, 1893	-----	Henry J. Huston
Bijou Valley Reservoir	Bijou creek	{ Bijou Valley ditch }	Sept. 28, 1893	Sept. 4, 1893	372,438,000	A. M. Fahringer
The Brush Reservoir	{ Upper Platte and Beaver canal }	Feeder to same	Nov. 18, 1893	Mar. 15, 1893	27,000,000	The Brush Reservoir Co.
The Moore Reservoir	Deer Trail creek	Moore ditch	Nov. 24, 1893	Nov. 6, 1893	8,704,800	E. K. & J. L. Moore
Mary Lawless Reservoir	West Bijou	Mary Lawless	Mar. 20, 1894	Dec. 23, 1893	74,605,590	Mary Lawless
Minnig Reservoir	Spring creek	{ Enl'rg'm't ditch }	April 17, 1894	Feb. 15, 1894	-----	Moses Minnig
Mikkelsen & Arnold Reservoir	Well in draw	{ Feeder to same }	April 26, 1894	April 15, 1892	4,000,000	{ Chas. Arnold and H. Mikkelsen }
K. K. Reservoir	West Kiowa creek	Supply ditch	May 19, 1894	May 6, 1894	7,000,000	The United R. E. & Trust Co.
		Built on stream	June 11, 1894	-----	-----	{ The Drury Land and Irrigation Co. }

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 2, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, JOS. H. HODGSON, DENVER, COLO., APPOINTED.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Lupton Short Line Ditch	South Platte	Feb. 18, 1893	Jan. 23, 1893	79.20	The Lupton Short Line Ditch Co.
Tesch Ditch	{ Underground and underflow waters of Sand creek }	Mar. 7, 1893	Jan. 1, 1893	6.00	James G. Tesch
Riethmann East Ditch	Second creek	Mar. 18, 1893	Mar. 13, 1893	25.00	Emile J. Riethmann
Riethmann West Ditch	Second creek	Mar. 18, 1893	Mar. 13, 1893	25.00	Emile J. Riethmann
Riethmann East and West Ditches (amended statement)	Seepage, waste and flood in Sec'nd ck.	April 8, 1893	Mar. 13, 1893	25.00	Emile J. Riethmann
Second Creek as Lateral Ditch (claim)	South Platte	April 8, 1893	Mar. 4, 1889		Emile J. Riethmann
Lupton Short Line Ditch and Reservoir Co.'s Ditch	South Platte	May 4, 1893	July 6, 1892	72.00	Geo. W. Twombly, Pres.
J. and S. Ditch	Little Dry creek	June 2, 1893	May 22, 1893	12.50	Severus Junge and M. W. Slate
Evans No. 1 Ditch	Big Thompson	June 27, 1893	Mar. 1882	30.00	Town of Evans
Pioneer Seepage Ditch	Seepage	Sept. 2, 1893	Aug. 23, 1893	20.00	O. & W. J. Etnes and F. F. Lemmon
Feeders No. 1 Ditch	Waste	Nov. 2, 1893	Oct. 5, 1893	385.00	Farmers' Independent Ditch Co.
Canal No. 1	Seepage and waste	Jan. 19, 1894	Nov. 29, 1893	100.00	Western Drainage and Water Supply Co.
Lambrecht Seepage Ditch	South Platte	Jan. 22, 1894	Jan. 20, 1894	50.00	W. A. Davis and Christ Lambrecht
Coal Creek and Water Co.'s Ditch	Coal creek	Feb. 17, 1894	Sept. 29, 1893	30.00	Alfred H. Clements

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Bourbon Seepage Ditches.....	Cache La Poudre.....	Feb. 21, 1894	Dec. 11, 1893	.....	..... Charles A. Bourbon
Extension to Canal No. 1	South Platte	Feb. 21, 1894	Jan. 26, 1894	200.00	..... Western Drainage and Water Supply Co.
Coal Creek Water Co.'s Ditch.....	Coal creek	Feb. 21, 1894	Sept. 29, 1893	30.00	..... J. S. Kearney
Feeder No. 1 to Union Ditch.....	Waste surface seepage.	Feb. 27, 1894	Jan. 16, 1894	70.00	..... Union Ditch Co.
McCanne Ditch Extension.....	Seepage and spring.	Mar. 23, 1894	Jan. 25, 1894	40.00	..... D. J. McCanne
Burlington Ext'n Ditch Co.'s Ditches	Oasis reservoir	May 31, 1894	Mar. 1894	25 each	..... Burlington Extension Ditch Co.
The Roberts Drainage	Drainage.....	Nov. 30, 1894	Sept. 20, 1894	2.33	..... L. H. Roberts

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 2, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Warden Lake and Reservoir	South Platte	Not given	Mar. 20, 1893	Mar. 16 1893	13,264,000	Warden Lake and Res. Co.
Oasis Reservoir	Burlington ditch	Not given	June 15, 1893	July 15, 1888	396,000,000	{ Burlington Ditch Reser- voir and Land Co.
Pardee Reservoirs	{ Dry creek, Union & High Line ditches }	Not given	Sept. 5, 1893	{ June 1883 to } { Aug. 18, 1893 }	-----	----- W. W. Pardee
The Bucker's Ditch Res. No. 1.	Springs and seepage	Beever Lake ditch	Nov. 29, 1893	July 20, 1892	3,250,000	{ The Bucker Irrig., Milling and Improvement Co.
Salomon Lake Reservoir	Springs and seepage	Not given	Dec. 22, 1893	-----	2,600,000	----- Matilda Salomon

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 3, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, R. Q. TENNEY.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
The Cache la Poudre Feeder.....	{ Dry creek, Ames' } { slough..... }	Jan. 6, 1893	Feb. 10, 1892	140.00	..... The Cache la Poudre Reservoir Co.
The Cache la Poudre Outlet Ditch....	{ Cooper's slough & } { Box Elder creek. }	Jan. 6, 1893	Feb. 10, 1892	200.00	..... The Cache la Poudre Reservoir Co.
Aldrich Ditch	{ Stonewall creek & } { seepage..... }	Feb. 25, 1893	Feb. 21, 1893	6.25	..... Asa H. Aldrich
Abram Washburn Ditch No. 4	Coopers' slough.....	Feb. 28, 1893	Feb. 23, 1893	25.00	..... Abram Washburn
Neilson Ditch.....	.....	Mar. 6, 1893	.....	.....	..... No data—plat only, signed by surveyor
Hopkins' Seepage Ditch.....	{ Seepage, drainage } { and waste waters }	Mar. 8, 1893	Mar. 3, 1893	4.00	..... Lewis A. Hopkins
The Wood Inlet Ditch	{ Cache la Poudre & } { seepage..... }	Mar. 21, 1893	Jan. 15, 1893	60.00	..... Wood Reservoir and Ditch Co.
The Wood Outlet Ditch.....	{ Cache la Poudre & } { seepage..... }	Mar. 21, 1893	Jan. 15, 1893	10.00	..... Wood Reservoir and Ditch Co.
The Wood S'page Ditches or Feeders	Seepage	Mar. 21, 1893	.....	.....	..... Wood Reservoir and Ditch Co.
Coal Bank Draw Ditch.....	{ Seepage, drainage } { and waste waters }	Mar. 24, 1893	Nov. 25, 1892	20.00	..... Benjamin H. Eaton
The Timnath Drain and Irrig. Ditch	Washburn slough....	April 28, 1893	April 3, 1893	21.45	..... The Timnath Drain and Irrig. Ditch Co.
Lake Canal Ditch.....	Cache la Poudre.....	May 4, 1893	April 19, 1893	6.00	..... Asa M. Horner

A. H. Cuyler's Seepage Ditch.....	Slough.....	May 15, 1893	Feb. 15, 1893	9.90	Kate C. Wells
Lander's Feeder.....	Cache la Poudre.....	May 17, 1893	May 1, 1893	10.00	James H. Landeis
Edgar F. Hurdle Ditch.....	Lone Tree creek.....	May 20, 1893	June 15, 1892	5.00	Edgar F. Hurdle
The Seaman-Sanborn Spring Supply Storage Ditch.....	Seepage.....	May 22, 1893	Feb. 21, 1893	15.00	Milton Seaman and Burton D. Sanborn
Pleasant Valley Gordon Ditch.....	{ North fork college } { waste way..... }	June 13, 1893	-----	4.50	Joseph A. Gordon
L. B. Francis Seepage Ditch.....	{ Seepage on land of } { W. H. Rice..... }	May 22, 1893	May 9, 1893	6.00	J. Logan Francis
Dowding Drain and Irrigation Ditch	Seepage and waste.....	July 10, 1893	June 2, 1893	38.50	John Dowding
Windsor Canal.....	Cache la Poudre.....	Aug. 8, 1893	{ May 30, 1893 } { enlargement..... }	200.00	Windsor Reservoir and Canal Co.
Francis Seepage Ditch No. 1.....	Seepage.....	Aug. 15, 1893	June 26, 1893	-----	J. L. Francis
Francis Seepage Ditch No. 2.....	Seepage.....	Aug. 15, 1893	June 26, 1893	200.00	J. L. Francis
Greeley Drain Extension Ditch.....	Seepage.....	Aug. 23, 1893	Aug. 14, 1893	7.55	W. Albrecht Insinger
Larimer County Ditch.....	Cache la Poudre.....	Nov. 15, 1893	April 25, 1881	469.80	Larimer County Ditch Co.
B. D. Sanborn Water Appropriation..	Mill power ditch.....	Nov. 21, 1893	Sept. 2, 1893	18.00	B. D. Sanborn
Camp Brothers' Ditch.....	Slough.....	Dec. 1, 1893	Sept. 9, 1893	21.00	Camp Brothers
Tubbs & Van Hamm Ditch.....	Mail creek.....	Dec. 2, 1893	Nov. 6, 1893	29.10	P. P. Tubbs and John Van Hamm
Camp Sub-Irrigating and Irrigating Sloughs and Ditch.....	{ Seepage water of } { slough..... }	Dec. 19, 1893	Sept. 20, 1893	1.50	Charles Camp and Archibald L. Camp, Jr.
Smillie Seepage Ditch.....	Seepage and waste.....	Dec. 20, 1893	Nov. 20, 1893	11.00	A. J. Smillie
River Supply to Camp Bros' Ditch..	Cache la Poudre.....	Jan. 8, 1894	Jan. 4, 1894	30.00	Charles Camp
Jameson Seepage and Irri. Ditch...	Seepage and spring.....	Feb. 1, 1894	Dec. 18, 1893	8.25	James D. Jameson
Little Coy Ditch.....	Cache la Poudre.....	Feb. 20, 1894	Dec. 13, 1893	4.40	John G. Coy
The Tombaugh Seepage Ditch No. 1	Seepage water.....	Feb. 28, 1894	Dec 14, 1893	6.00	Levi Tombaugh

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Roberts Bros. Drain and S'page Ditch	Seepage water	Mar. 7, 1894	Mar. 2, 1894	14.00	..... Roberts Bros.
Fort Collins Sewer Ditch	Fort Collins sewer	June 4, 1894	June 1, 1890	7.15	..... John G. Coy
Larimer Co. Ditch (Enlargement)	Cache la Poudre	Aug. 22, 1894	May 26, 1894	422.90	..... Water Supply and Storage Co.
Salisbury Ditches Nos. 1 and 2	North Rabbit creek	Oct. 12, 1894	April, 1885	8.00	..... E. C. Salisbury
Golding Dwyre Seepage Ditch	Seepage	Oct. 4, 1894	July 9, 1874	7.75	..... C. Golding Dwyre
Larimer County Extension Ditch	Cache la Poudre	Oct. 3, 1894	Sept. 18, 1894	138.00	..... Daniel A. Canfield and William Drury

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 3, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The Cache la Poudre Reservoir	Cache la Poudre ----	Supply ditch ----	Jan. 6, 1893	Feb. 10, 1892	368,000,000	The Cache la Poudre Res. Co.
The James Lake Reservoir ----	Cache la Poudre ----	Larimer Co. ditch	Feb. 8, 1893	Dec. 1, 1892	34,893,544	F. T. James & C. J. Markham
Mountain View Reservoir ----	Not given ----	Dry creek, feeder	Feb. 20, 1893	-----	-----	The Mountain View Res. Co.
The Wood Reservoir ----	{ Cache la Poudre & seepage ----	{ Inlet ditch and seepage ditches }	Mar. 21, 1893	Dec. 22, 1892	120,000,000	The Wood Res. and Ditch Co.
Northern Reservoir ----	{ Poudre and Big Thompson ----	{ London ditch, Bushnell High-Line Lar. Co. No. 2 New Mercer & Ple's'nt Val'y & Lake canal }	April 11, 1893	Jan. 13, 1893	1,143,450,000	{ The Northern Water Storage, Mining, Milling and Ditch Co.
Wallace Reservoir ----	Not given ----	Canal No. 2 ----	April 24, 1893	April 15, 1893	5,500,000	----- Nancy A. Wallace
Private Reservoir (1) ----	Lone Pine creek ----	Feeder to same --	May 2, 1893	April 7, 1893	25,287,500	----- George B. Gardiner
Private Reservoir (2) ----	Lone Pine creek ----	Feeder to same --	May 2, 1893	April 7, 1893	4,357,500	----- George B. Gardiner
Private Reservoir (3) ----	Lone Pine creek ----	Feeder to same --	May 2, 1893	April 7, 1893	4,336,250	----- George B. Gardiner
J. W. King Reservoir ----	{ Larimer and Weld canal ----	Roullard lateral --	May 4, 1893	Feb. 7, 1893	5,165,800	----- John W. King
Landers' Reservoir ----	Cache la Poudre ----	Landers' lateral --	May 17, 1893	May 1, 1893	2,200,000	----- James E. Landers
Campbell Reservoir ----	Cache la Poudre ----	Campbell lateral '1.	June 12, 1893	Mar. 15, 1893	9,768,330	Walt. S. & Frank A. Campbell

STATEMENT CONCERNING RESERVOIRS—Concluded.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Smith Reservoir No. 2	Box Elder creek	Smith Ditch	June 19, 1893	May 1, 1893	13,000,000	..... J. Letford Smith
Francis Seepage Reserv'r No. 1	Seepage	Seep. ditch No. 1	Aug. 8, 1893	May 30, 1893	510,000,000	Windsor Res. and Canal Co.
Francis Seepage Reserv'r No. 2	Seepage					
Lomas Reservoir	Cache la Poudre	Larimer Co. d'ch	Aug. 15, 1893	June 26, 1893	17,968,500	..... J. L. Francis
Windsor Reservoir	Cache la Poudre	{ Larimer and } { Weld canal. }	Oct. 9, 1893	Sept. 28, 1893	3,050,000	..... Thomas Lomas
Dickerson Reservoir	Cache la Poudre	{ Larimer and } { Weld canal. }	Nov. 10, 1893	Oct. 18, 1893	1,830,000	..... Alva R. Dickerson
Larimer Co. Reservoirs Nos 1-7	Cache la Poudre	Larimer Co. d'ch	Nov. 15, 1893	April 25, 1891	.....	Larimer County Ditch Co.
S. H. Southard Reservoir No. 1	Larimer county d'ch	Feeder to same	Dec. 9, 1893	Sept. 14, 1893	21,867,000	..... S. H. Southard
S. H. Southard Reservoir No. 2	Larimer county d'ch	Feeder to same	Dec. 9, 1893	Sept. 14, 1893	34,365,000	..... S. H. Southard
Nannann Lake Reservoir	Canal No. 2	Feeder to same	Mar. 19, 1894	Jan. 18, 1894	12,197,000	Nannann Lake Reservoir Co.
Hardscrabble Reservoir	Surface, etc.	{ Hardscrabble } { ditch	Mar. 19, 1894	Mar. 10, 1894	1,250,000	..... Amos Ackroid
Henderson Reservoir	{ Poudre & Larimer } { rivers	Larimer Co. d'ch	April 27, 1894	Jan. 31, 1894	9,500,000	..... U. M. Henderson
Duck Slough System of Reservoirs—Reservoir No. 1	Larimer county d'ch	{ Duck Slough } { Seepage d'ch }	May 8, 1894	April 9, 1894	27,500,000	..... D. G. Brooks
Duck Slough Reservoir	Larimer county d'ch	{ Duck Slough } { Seepage d'ch }	May 8, 1894	April 9, 1894	350,000	..... D. G. Brooks
Lone Tree Creek Reservoir	Lone Tree creek	Ditch No. 2	Oct. 12, 1894	Feb. 2, 1889	8,000,000	..... John B. Cooke

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 4, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, W. H. LAWS.

NAME OF DITCH OR CANAL,	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Wright's Seepage Ditch	Seepage and waste..	Feb. 17, 1893	Dec. 15, 1892	3.50	..... Louisa M. Wright
B. B. Harris Draining and Irri. Ditch	Seepage	Nov. 14, 1894	Aug. 22, 1894	15.50	..... B. B. Harris
Miner & Lougan Ditch	Little Thompson....	Nov. 22, 1893	Aug. 23, 1893	40.08	..... John R. Miner and Henry C. Lougan
Robt. Jackson Drn and S'page Ditch	Drain and seepage..	Mar. 27, 1894	April 21, 1892	4.00	..... Robert Jackson
Catch What You Can Ditches Nos. 1, 2	Springs and waste..	April 11, 1894	July 10, 1893	{ 2.50 2.60 }	..... P. H. Boothroyd
McClung Ditch	Waste and seepage..	May 2, 1894	Mar. 1, 1894	7.60	..... J. Harvey McClung

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 4. RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The People's Reservoir	Big Thompson creek	Barnes ditch	Jan. 19, 1893	Jan. 14, 1893	563,715,512	Elbert C. Smith et al.
Dawkins' Reservoir	{ Seepage and Big Thompson creek }	Greeley and Lovell'd ditch {	Jan. 27, 1893	Dec. 1, 1892	1,105,950	{ Richard W. Dawkins and Jonathan C. Whatley. }
Wright's Fish Ponds	Seepage and waste..	Built on stream ..	Feb. 17, 1893	Dec. 15, 1892	276,000	..... Louisa M. Wright
Northern Reservoir	{ Part from Big Thompson creek and part from District 3	{ The Louden ditch, the Bushnell High Line, Larimer Co. No. 2, the New Mercer and Pleasant Val- ley and Lake canal	April 11, 1893	Jan. 13, 1893	1,143,450,000	{ The Northern Water Stor- age, Reservoir, Mining, Milling and Ditch Co. }
Wallace Reservoir	{ Seepage N. L. Ex. Canal No. 2	Canal No. 2	April 24, 1893	April 15, 1893	5,500,000	..... Nancy A. Wallace
Mariano Reservoir	Big Thompson	Geo. Rist ditch..	June 19, 1893	Mar. 2, 1893	74,870,858	{ The Consolidated Home Supply Ditch and Res Co. }
Brown-Willis Reservoir	Springs and seepage	Built on stream ..	June 24, 1893	Nov. 1, 1887	400,000	Sarah Brown and Geo. Willis
Steele Reservoir	Big Thompson	{ Greeley and Lovell'd canal }	Sept. 1, 1893	June 1, 1889	1,600,000	J. B. Phillips and Robt. Steele
Willow Park Reservoir	Big Thompson	Feeder thereto ..	Oct. 3, 1893	Sept. 24, 1893	546,031,520	.. Willow Park Reservoir Co.
Loveland & Greeley Reservoir.	Thompson Ditch ..	{ Barnes & Lou- den ditches.. }	Mar. 26, 1894	Dec. 27, 1893	600,259,214	{ The New Loveland & Gree- ley Irrig. & Land Co. }
Big Hollow Reservoir	Waste and seepage..	Built on stream ..	July 21, 1894	June 4, 1894	1,150,000	..... Martha J. Gard

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 5, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. W. DANIELS.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Wiswall Ditch	Dry creek	Dec. 29, 1892	Nov. 10, 1892	14.00	W. B. Wiswall
Fesler Ditch	Barclay creek	Feb. 8, 1893	Jan. 30, 1893	2.20	G. W. Fesler and W. H. Dickens
Davis Ditch	{ Abraham and Li- kins' gulches }	May 25, 1894	May 4, 1894	1.00	Ernest P. Dargin and Sarah C. Davis
Barclay Ditch No. 1	Slough	Oct. 24, 1894	July 20, 1894	2.00	J. C. Barclay

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 5, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Upper Reservoir	St. Vrain creek	Feeder thereto	Dec. 28, 1892	Dec. 23, 1892	13,590,000	W. M. Atwood
Belmire Reservoir	St. Vrain creek	Terry lat'r'l ditch	April 18 1893	Jan. 18, 1893	2,003,760	William Atwood
Hill Top Reservoir	St. Vrain creek	Feeder thereto	April 25, 1893	Dec. 23, 1892	13,590,000	Hill Top Reservoir Co.
Beaver Brook Reservoir and Canal Co.'s Reservoir No. 1	{ South Fork, Middle St. Vrain or Bea- ver creek }	Built on stream	Sept. 11, 1893	June 19, 1893	121,186,403	{ Beaver Brook Reservoir and Canal Co.
Beaver Brook Reservoir and Canal Co.'s Reservoir No. 2	{ South Fork, Middle St. Vrain or Bea- ver creek }	Built on stream	Sept. 11, 1893	June 19, 1893	32,381,081	{ Beaver Brook Reservoir and Canal Co.
Holt Reservoir	St. Vrain creek	Highland ditch	Feb. 28, 1894	Dec. 22, 1893	4,809,000	A. D. Holt

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 6, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, A. C. STILLWELL.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Francis Smart Feeder.....	Coal creek	Dec. 8, 1892	Nov. 21, 1892	76.60	..... Francis Smart
United Feeder	Community ditch	July 6, 1893	June 20, 1893	25.00	..... United Real Estate and Trust Co.
McKay Ditch	Coal creek	May 5, 1893	Nov. 1, 1881	40.00	..... J. W. T. McKay
Marshall Ditches Nos. 1 and 2	Spring brook	July 17, 1893	{ June, 1887 { June, 1892	5.00 5.00	..... James Marshall
Willis Ditch	Coal creek	Mar. 14, 1894	May 5, 1870	9.00	..... W. A. Willis et al.
Bull's Head Gulch Ditch	{ Waste, seepage { and springs	April 26, 1894	June 4, 1889	3.00	..... Hiram Prince
Erie Coal Creek Ditch	Coal creek	June 14, 1894	Mar. 20, 1894	25.00	..... George Zimmerman et al.

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 6 RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Francis Smart Reservoir	Coal creek	Feeder to same	Dec. 8, 1892	Mar. 21, 1892	21,581,911	Francis Smart
Thomas Reservoir	South Boulder creek	{ South Boulder } { Canon ditch }	Jan. 23, 1893	Mar. 1, 1892	5,989,500	J. J. Thomas et al.
Elmwood Reservoir	{ South Boulder creek } { and Canon ditch }	{ Mitchell, Thos. } { & De Sellem } { lateral ditch }	May 1, 1893		6,587,000	{ Jas. De Sellem and Thomas. H. Paull }
McKay Reservoir	Coal creek	McKay ditch	May 5, 1893	Nov. 1, 1881	17,424,000	J. W. T. McKay
United Reservoir	Community ditch	United ditch	July 6, 1893	June 20, 1893	5,000,000	United Real Est. & Trust Co.
The Mesa Reservoir	Boulder creek	Silver Lake ditch	Jan. 20, 1894	Dec. 4, 1893	21,780,000	J. P. Maxwell & Geo. S. Oliver
Bull's Head Gulch Reservoir	{ Waste, seepage and } { springs }	{ New So. Boul- } { der Canon } { ditch }	April 26, 1894	June 4, 1889		Hiram Prince
Six Mile Reservoir	Boulder creek	{ Boulder and } { White Rock } { ditch }	Nov. 9, 1894	Aug. 20, 1894	41,725,300	Six Mile Ditch and Res. Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 7, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, GEO. R. ARNOLD.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Menkle Ditch	Waste	Dec. 14, 1892	April 15, 1891	-----	J. D. Menkle
Denver Water Power Pipe Line	Clear creek	Jan. 3, 1893	Nov. 25, 1892	100.00	Zac. T. Duval and W. H. Wood
Shay Ditch	Moon's gulch	Jan. 4, 1893	Oct. 15, 1878	7.50	Joseph H. Shay
Cook Ditch No. 1	{ Seepage and a small creek }	Jan. 26, 1893	June 1, 1887	7.83	Laura E. Cook
Cook Ditch No. 2	Cook reservoir No. 2	Jan. 26, 1893	{ May or June, 1885 }	7.73	Laura E. Cook
Cook Ditch No. 3	A small creek	Jan. 26, 1893	{ May or June, 1885 }	7.00	Laura E. Cook
Cook Ditch No. 4	Cook reservoir No. 1	Jan. 26, 1893	{ May or June, 1885 }	7.00	Laura E. Cook
Berthoud Pass Canals	{ St Louis, Vasquez, Elk, Currant creeks and heads of Frazier river }	Mar. 4, 1893	Dec. 24, 1892	711.00	The Berthoud Pass Canal and Tunnel Co.
Enlargement of the Golden City and Ralston Creek Ditch	{ Clear creek and Ralston }	Mar. 4, 1893	Dec. 5, 1892	{ 243.00 } { 500.00 }	{ The Golden-Ralston Creek and Church Ditch Co. }
James Ditch	The slough	May 13, 1893	May 4, 1893	6.00	John Perkins James
Zilligan & Conch Ditch	Tucker Gulch creek	June 16, 1893	May 4, 1881	36.00	Joseph Zilligan
Green Mountain Highland Ditch	Mt. Vernon creek	June 20, 1893	June 8, 1893	130.00	W. W. Pardee
Winterbottom & Breen Ditch	Strain gulch	June 29, 1892	June 20, 1893	51.70	Winterbottom & Breen

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL.	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Culfax Waste Water Ditch	Waste	July 26, 1893	July 19, 1893	5.00	W. W. Pardee
Westminster Waste Water Ditch	Waste	July 26, 1893	July 15 1893	5.00	W. W. Pardee
Mary Morgan Waste Ditch	Manhart ditch	Aug. 29, 1893		2.00	Mary Morgan
The Slough Drainage Ditch	Slough and waste	Aug. 29, 1893	Aug. 11, 1893	5.00	W. W. Pardee
Economy Ditch	McIntyre gulch	Sept. 15, 1892	June 20, 1893	3.00	James S. Jillison
Quantance Ditch	Tucker creek	Oct. 14, 1893	May, 1879	36.90	Leander Quantance
E. M. Eggleston Ditch	Drainage and s'page	Oct. 26, 1893	Oct. 24, 1893	4.85	E. M. Eggleston
The Clear Ditch	Dry creek	May 22, 1894	April, 1882	18.00	W. W. Sherrick
Braun & Ellis Ditch	Springs	May 28 1894		14.43	Braun & Ellis

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 7, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAMK OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Cook Reservoir No. 1.....	{ Seepage and a } { small creek..... }	Built on stream.	Jan. 26, 1893	June 1, 1885	622,875	----- Laura E. Cook
Cook Reservoir No. 2.....	{ Seepage and a } { small creek..... }	Built on stream.	Jan. 26, 1893	June 1, 1883	410,873	----- Laura E. Cook
Green Mt. Highland Reser- voirs Nos. 1-6.....	Mt. Vernon creek....	{ Mt. Vernon & } { Apex creeks }	June 20, 1893	June 8, 1893	56,679,000	----- W. W. Pardee
Winterbottom and Breen Res- ervoirs Nos. 1 and 2.....	Strain gulch..... { Big dry creek and } { Frazer & Grand } { rivers..... }	Feeder to same..	June 29, 1893	June 20, 1893	{ 280,000 } { 343,580 }	----- Winterbottom & Breen
Big Dry Creek Reservoirs.....	Clear creek.....	Built on stream.	Aug. 29, 1893	Aug. 11, 1893	3,263,000	----- W. W. Pardee
Cowden Reservoir.....	{ Dry creek, Union } { & High Line ditch }	Union ditch. ---	Sept. 5, 1893	Feb. 14, 1890	284,500	----- Mrs. C. W. Cowden
Pardee Reservoirs Nos. 1-10.....	{ Seepage from ra- } { vines & ag. ditch }	Feeder thereto..	Sept. 5, 1893	{ June 1883 to } { Aug. 18, 1893 }	-----	----- W. W. Pardee
The De Vinney Reservoirs.....		-----	July 30, 1894	1893	740,659	----- George W. De Vinney

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 8, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, S. F. COUCH.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Denver Water Power Pipe Line	South Platte	Jan. 3, 1893	Nov. 28, 1892	200.00	Zac. T. Duval and W. H. Wood
The Culter Pumping Plant. Pipe Line and Ditch	Little Dry creek	April 25, 1893	April 24, 1893	5.00	Richard A. Culter
Castle Rock Water Works	East Plum creek	Aug. 30, 1893	Sept. 20, 1891	3.46	Town of Castle Rock
P. W. O'Brien Ditch and Extension	East Plum creek	Oct. 24, 1893	Aug. 16, 1893	5.25	P. W. O'Brien
Alfred G. Perry Ditch Extension	East Plum creek	Nov. 17, 1893	Nov. 1, 1893		Arthur H. White
Gilbert Ditch	Cherry creek	Oct. 14, 1893	Aug. 20, 1887	3.00	Henry Gilbert
New Enterprise Ditch	Plum creek	Feb. 14, 1894	Feb. 9, 1894	6.00	The New Enterprise Ditch Association
Shell Ditch	Barker creek	June 20, 1894	Mar. 1, 1887	2.70	Alfred Shell
The Legere Ditch	West Plum creek	July 3, 1894	April 10, 1894	16.00	P. F. Legere
Lyman Ditch	Draw	Sept 20, 1894	Sept. 5, 1894	4.00	Edward C. Lyman
Shell Ditch No. 2	Barker creek	Nov. 19, 1894	Mar., 1887	2.85	Alfred Shell
Round Top Ditch	Round Top draw	Nov. 22, 1894	July 2, 1894	4.00	Hannah Croft

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 8, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The Legere Reservoir.....	West Plum creek ...	Legere ditch	July 3, 1894	April 10, 1894	3,848,000	..... P. F. Legere
Meadow Glen Reservoir.....	Bear creek	{ Ward & Ken- drick ditch.. }	Oct. 1, 1894	Sept. 25, 1894	612,500	..... Edward A. Temple

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 9, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONERS, F. EWEERS AND J. A. VAN GORDON.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Trout Lake Pipe Line	Bear creek	Dec. 12, 1892	Spring, 1888	1.00	{ The Trout Lake Townsite, Water and Improvement Co.
Denver Water Power Pipe Line	Bear creek	Jan. 3, 1893	Nov. 16, 1892	30.00	----- Zac. T. Duval and W. H. Wood
Dorr Ditch	Miller's gap	Jan. 31, 1893	Jan. 28, 1893	38.00	----- W. H. Dorr
Lake Ann Feeder	Turkey creek	Feb. 8, 1893	Dec., 1892	40.00	----- William Harvey
Hamlin Ditch	{ The gulch (Weaver) creek }	May 2, 1894	May 1, 1889	500.00	----- Elizabeth Hamlin

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 9, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Trout Lake Reservoir	Bear creek	{ Trout Lake Pipe Line }	Dec. 12, 1892	Spring, 1888	14,601,000	{ The Trout Lake Townsite, Water and Improvement Co.
Dorr Reservoir	Miller's gap	Dorr ditch	Jan. 31, 1893	Jan. 28, 1893	325,000	----- W. H. Dorr
Lake Ann Reservoir	Turkey creek	Dean ditch	Feb. 28, 1893	Dec. 1, 1892	12,500,000	----- William Harvey
Soda Lake Reservoir (1)	Bear creek	{ Arnett or Har- riman ditch }	May 9, 1893	Feb. 11, 1893	20,252,689	----- Harriman Ditch Co.
Soda Lake Reservoir (2)	Bear creek	{ Arnett or Har- riman ditch }	May 9, 1893	Feb. 11, 1893	100,000,000	----- Harriman Ditch Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 23, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, L. HALL.

NAME OF DITCH OR CANAL.	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Givens' Ditch	Horse creek	Mar. 11, 1893	May 1, 1889	5.00	Byron L. Miller
North Beaver Ditch	{ North Fork of Beaver creek }	Mar. 20, 1893	July, 1890	8.00	David Baker
Winkler Ditch No. 1	Cook creek	May 24, 1893	April 1, 1882	1.24	Charles McArthur
Winkler Ditch No. 2	Cook creek	May 24, 1893	April 1, 1885	.69	Charles McArthur
Henry Clark Ditch No. 1	West creek	July 19, 1893	Summer, 1880	3.00	Henry Clark
Henry Clark Ditch No. 2	West creek	July 19, 1893	Summer, 1880	3.00	Henry Clark
Henry Clark Ditch No. 3	Trail creek	July 19, 1893	Spring, 1882	2.56	Henry Clark
Henry Clark Ditch No. 4	Trail creek	July 19, 1893	Spring, 1882	2.66	Henry Clark
Fulton Ditch	Beeler creek	Aug. 9, 1893	July 24, 1893	7.00	Carl Fulton
Elder Ditch	Beeler creek	Aug. 9, 1893	July 24, 1893	7.00	A. R. Elder
Long Park Ditch	{ Yellow or Tumble creek }	Oct. 5, 1893	May 15, 1893	30.00	John Jones and S. H. Pease
Dick's Pass Ditch	Deer creek	July 14, 1894	June 6, 1894	15.00	A. R. Kinsley et al.
Hogue Ditch	Cordoroy creek	July 14, 1894	July 11, 1894	6.00	John M. Hogue
Kennedy Ditch	{ East Fork of Tay- lor gulch }	Aug. 22, 1894	1891	8.00	Owen Kennedy

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 23, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Long Park Reservoir -----	{ Yellow or Tumble } creek -----	Long Park ditch	Oct. 5, 1893	May 15, 1893	-----	--John Jones and S. H. Pease
South Platte Reservoir -----	{ So. Fork of South } Platte and Lost Park creek and Turkey creek ---	Feeder to same..	June 19, 1894	Jan. 23, 1893	3,005,850,660	{ South Platte Canal and Res- ervoir Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 46, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, FRANK STAPLES.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Pleasant Valley Ditch.....	North Fork river....	May 27, 1893	Oct. 18, 1889	40.00	..... Arthur E. Hill
Homestead Ditch	Big Grisley river....	April 24, 1894	April 24, 1894	.....	..... James McFarlane

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 47, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, W. S. BECKWITH.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Hubbard Ditch No. 3	Illinois creek	Oct. 23, 1893	July 4, 1893	90.00	..... Edward R. Hubbard
Medicine Bow Ditch	Canadian river	April 18, 1894	Sept. 21, 1893	145.00	..... The North Park L. and Cattle Co.
The Newport Ditch, Enlargement and Extension	Pinkham creek	July 30, 1894	May 15, 1894	13.00	..... John S. King
King Ditch	Pinkham creek	July 30, 1894	Dec. 2, 1893	8.00	..... Mary A. King
Timothy Ditch	Pinkham creek	Aug. 13, 1894	May 10, 1894	3.50	..... John S. King
The John Fleck Ditch	Muddy creek	Oct. 24, 1894	June, 1885	6.00	..... Leslie Gillet

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 48, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, A. J. HANCE.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAME OF CLAIMANT
The Comet Irrigating Ditch -----	McIntyre creek -----	Dec. 19, 1892	Dec. 3, 1892	-----	----- Rufus M. Brown

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 64, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, R. J. PATTERSON.

NAME OF DITCH OR CANAL,	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Adams Ditch.....	South Platte	Jan. 14, 1893	Oct. 10, 1892	25.00	.....John Adams & Co.
Sedgwich Ditch.....	South Platte	Feb. 13, 1893	Oct. 24, 1892	73.00	.....J. F. Lucas et al.
Bravo Ditch.....	South Platte	June 2, 1893	Feb. 21, 1893	40.00	.....W. C. Harris et al.
Powell & Dillon Canal.....	South Platte	Feb. 8, 1894	Dec. 12, 1893	30.00	.....Powell & Dillon Ditch Co.
McWilliams Canal.....	Atwood creek.....	Aug. 13, 1894	June 19, 1894	8.00	.....John H. McWilliams
Red Lion Ditch, Enlargement.....	Spring creek.....	Aug. 22, 1894	April 10, 1894	5.50	.....R. O. Bell
Smith & Upson Ditch.....	South Platte	Sept. 22, 1894	Aug. 28, 1894	30.00	.....Edward C. Smith & William G. Upson
The Ramsey Ditch.....	South Platte.....	Oct. 24, 1894	Aug. 3, 1894	22.00	.....John W. Ramsey
The Huston Ditch.....	South Platte	Nov. 28, 1894	Sept. 17, 1894	52.00	.....G. C. Huston
The Ramsey Seepage, Ranch Ditch.....	Spring creek.....	Nov. 30, 1894	Sept. 10, 1894	2.46	.....John W. Ramsey

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 64, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAME OF CLAIMANT
McWilliams' Reservoir -----	Cottonwood creek --	McWilliams' dt'h	Aug. 13, 1894	June 19, 1894	-----	-----John H. McWilliams

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 65, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
E. G. Davis Ditch—amended statement	Springs	Feb. 23, 1893	April 28, 1891	9.40	E. G. Davis
Hays' Ditch	Black Wolf creek	June 22, 1893		19.62	W. R. Hays
State Line Creek Ditches, Nos. 1 and 2	State Line creek	Jan. 20, 1894	Oct. 31, 1893	2.50	Robert S. Pike
Hays' Creek Ditch	Hays' creek	Feb. 3, 1894	Jan. 23, 1894	4.50	Thomas Hays
Rosenkrans' Ditch	Willow creek	Mar. 22, 1894	Dec. 23, 1893	20.10	Joseph Rosenkrans
The Leonard Ditch	Black Wolf creek	April 18, 1894	Mar. 26, 1893	21.12	George W. Leonard & Sons
The J. O. Jones Ditch	Cedar creek	May 18, 1894	April 26, 1893	3.00	J. O. Jones
The Strangway Ditch	Arickaree	May 29, 1894	May 24, 1893	42.88	Henry F. H. Strangway
Carroll Ditch	Workman creek	June 29, 1894	June 25, 1894	5.25	Frank A. Carroll
Hays' Creek Ditch (3)	Hays' creek	July 19, 1894	Mar. 11, 1894	30.00	Harvey Armstrong
The Caston Ditch	Black Wolf creek	Sept. 10, 1894	May 1, 1893	10.64	Volney G. and Harrison H. Caston
Galbreath Ditch	Spring stream	Sept. 10, 1894	May 1, 1894	10.00	S. L. and H. E. Galbreath
The Bar Eleven No. 4 Ditch	{ North Fork of Re- publican }	Oct. 3, 1894	Mar. 19, 1894		Joseph W. Bowles
The Nixon Ditch	Arickaree	Oct. 24, 1894	Oct. 24, 1894	26.80	Joseph A. Nixon

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
The G. B. W. Ditch	Arickaree	Nov. 5, 1894	June 12, 1894	2.00	..... George B. Webb
Middle Fork Ditch	Arickaree	Nov. 5, 1894	Oct. 22, 1894	4.00	..... George B. Webb
The Staenenger Ditch	Bloom creek	Nov. 14, 1894	Nov. 9, 1894	10.72	..... Eli Staenenger

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 65, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The E. G. Davis Reservoir— amended statement	Springs	E. G. Davis ditch	Feb. 23, 1893	April 28, 1891	359,185	..... E. G. Davis
Rosenkrans Reservoir	Willow creek	Built on stream.	Mar. 22, 1894	Dec. 23, 1893	9,000,000	..... Joseph Rosenkrans

Chapter III.

IRRIGATION DIVISION No. 2—ARKANSAS DIVISION.

C. B. Cramer, State Engineer:

Sir—Herewith I submit reports of the water commissioners and my own. One commissioner has nothing to say except that there is no water to distribute; the other returned blanks wholly or partially filled, and from these I have compiled the tables enclosed (Nos. I and 2). It is very difficult to persuade these gentlemen to make the required reports. Some complain that it is useless; others that they will not be paid for their labor. I would suggest that in future the blanks be distributed earlier, and while in the usual discharge of duty the commissioners could get data during the summer. Mr. Hineman made quite a voluminous report, from which I give extracts.

I will say in this connection that the methods of measuring in the mountain districts, if such guessing can be termed measuring, are the most crude. There can be no approach to accuracy with the system of a twelve or sixteen foot box and timing a chip floating through, the water perhaps not more than one or two inches deep.

I have tried to introduce a system of weir measurements which is simple and practically accurate. For the information of commissioners and consumers, I had tables printed containing Mr. Nettleson's figures for one and two feet weirs. These have been distributed, and next spring I expect they will be put

to good use. Up to this, 19th of December, there is one large canal from which I have not heard; I have waited for their statement for a week.

Extracts from water commissioners' reports are as follows:

District No. 10—You will see that I have taken the ditches on the main Fountain separately, and at your suggestion I grouped the ditches on each tributary. I have trouble getting statistics, as many are afraid it is a scheme about water rights.

J. W. PATTON,
Water Commissioner District No. 10.

District No. 11—Services not required much; only thirty-four days; plenty of water.

R. DEVERAUX,
Water Commissioner District No. 11.

District No. 12—I was called out on the 20th of March and quit October 26, but was not out all the time; put in 114 days on duty. With regard to Custer county reservoir I must inform you that it was not handled satisfactorily to the people. There was no one to look after it, and those using water had a free pitch in, consequently a very few got the water and the community was not benefited by having it at all. It should be placed in charge of the water commissioner next season and be managed in the interests of all the people. In this report you will see that a great many of the ditches have much more land under the ditches than was irrigated in various crops; the cause was a scarcity of water. There has been decreed to the various ditches a great deal more water than the streams carry, therefore there will never be enough for all under the present system of distribution.

J. T. SANDERS,
Water Commissioner Water District No. 12.

District No. 13—The precipitation of snow for the years 1893 and 1894 has been far below the average. The result of this was sadly felt in Wet Mountain valley during the summer of 1893 and the early portion of the irrigating season of 1894; during the

latter period the amount of water for irrigating purposes did not reach half the average of previous years. An unusual rainfall occurred during the month of June, usually considered a dry month. The devastation of the timber in the mountains is proving very disastrous, as it prevents natural storage more and more.

One of the greatest obstacles to the proper division of water in this district is the variations of volumes in the mountain streams, caused by the state of the weather, the amount being accelerated on a warm day or retarded by cold nights and cloudy days. There is fully four times the amount of water appropriated that the streams could carry. This causes much trouble among the ranchmen; also for the commissioner. There is much dissatisfaction at the present rating of ditches and the same should be done by the proper authorities at the earliest convenience. I was called out on April 23 and spent eighty-six days on the streams; also had an assistant for seventeen days.

L. A. HINEMAN,
Water Commissioner District No. 13.

District No. 19—The water in this district gave out in the early part of March, and the call for distribution came two months earlier than in any previous year. There are a great many ditches on the Las Animas river that were short on account of dams being washed away and water would run down before the dams could be replaced. The river was dry at this place (Trinidad) for two months. There has been little trouble distributing water this season, compared with last. There has been quite a good deal of alfalfa sown this year but the water being so scarce the crops were cut short below Trinidad. There is only one rating flume in this district. I have been trying to persuade the people to put them in and most of them talk favorably of it.

J. N. TURNER,
Commissioner District No. 19.

DOMESTIC WATER.

A great source of trouble to the water officers and still more so to people living under ditches at a distance from a visible supply—i. e., lakes or other ditches—is the omission in the statutory law to provide some method for distributing what is termed “domestic” water. There are some localities where this is an absolute necessity. Men in portions of district No. 17 have had to haul water for miles for house use and stock during the spring and fall of last year.

People in trouble naturally blame some one as the cause and in these instances make scapegoats of the men whose duty it is to distribute the water according to the decrees of the courts; the latter being compelled by their oaths to put to one side all sympathy and be guided by the laws of the state. This is the hardest thing we have to contend with, as people suffering under such conditions as above mentioned will not reason, cannot think straight and in fact appear to know nothing but that they want water, regardless of the rights adjudged to other persons and the explicit instructions and clearly defined duties of the superintendent and commissioners, who are allowed no discretionary powers whatever, and who render themselves liable for damages under their bonds for diverting water which has been decreed to some other ditch if they assume the responsibility of allowing a run of domestic water. I have taken that chance, always closing some of the older ditches, which can get along very well for a day or two without any, thus supplying the demand.

It is human, perhaps, to err, but it appears to me inhuman for people having been granted this privilege, at this risk, to abuse it by using this water for irrigating purposes; but many of them do it, knowing that it is almost impossible to detect them, owing to the immense area to be patrolled under some of the large canals.

I would suggest that the law on this point be amended so as to allow some discretion to the water officers, making the penalty more severe for irrigating with water turned in for domestic use, holding ditch managers and riders responsible for any abuse, even going to the extreme of punishing a man for allowing the water to waste on crops.

INJUNCTIONS.

One was served upon the water commissioner of District 16 and myself on May 27, 1894, restraining us from closing certain headgates; nearly all of them, in fact, on the upper Huerfano. This was caused by a letter of which the following is a copy:

Rocky Ford, Colo., March 25, 1894.

L. C. DeCamp, Water Commissioner District No. 16:

Sir—Yours of 21st inst. received; I do not see how we can dispute the decree of the court for what we may consider an informality. On looking over the list of ditches I find that they are all worded so in that district. It is stated in another place that the Daggett ditch was constructed in the latter part of 1895 and water appropriated in spring of 1880, but distinctly states that it is entitled to priority No. 2, and is ditch No. 2 in district 16, so there can be no question as to our duty being to shut off all but the Doyle ditch or No. 1, in favor of the Daggett ditch. This you will please do, using your discretion, of course, as to the flow of water required at the existing stage of water in the creeks.

WM. MATTHEWS,

Superintendent Irrigation Division No. 2.

The facts are, the Daggett ditch is located within eight miles of the mouth of the Huerfano. The ditches using the water were, many of them, 100 miles up the stream. The distance between said ditch and flowing water in the stream was reported by Mr. De Camp to be, at that time, May 21, eighty miles. The people were aroused, called and held a mass meeting after issuing circulars, passing resolutions and put up \$200 in cash to enforce them. They claimed, rightfully, no doubt, that the water would be actually

wasted and could never reach the ditch having made the demand for the reason that the bed of the creek between the points alluded to is an immense mass of sand, capable of absorbing many times the volume of water in the creek above. The law and justice in the case perhaps conflicted, but the injunction was not fought, and is still in force.

Another application for an injunction was made to restrain us from closing certain ditches in district No. 10. The parties owning the ditches, interested for the defense, failed to respond, so the injunction was granted and is still in effect. In this instance, the valley of the stream is in two water districts and under the jurisdiction of two courts. Here the question arises as to whether the parties in district No. 10, not having been made defendants when ditches on the lower part of the stream made their proof, can be affected by any decree or ruling made in these suits.

I would recommend that the legislature amend the laws establishing the boundaries of district No. 10 so as to include that portion of Pueblo county lying in the drainage basin of the Fountain. The reason for this change is that there shall be no conflict of authority as to the waters of this stream. As an example, if a ditch at the lower part of either of these streams, having priority over ditches near the upper end, runs short of water, the water commissioner of the lower end must notify the superintendent of the shortage and he must direct the commissioner of the upper district to allow so much water to pass out of his district. This takes time, perhaps several days, as either of the last mentioned officers may be away from home attending to his duties, and by the time the red tape is observed, the citizen's crop may be burned up or the bottom dropped out of the creek.

I would also advise a change of the boundaries of district No. 17, so that it would include that portion of Pueblo county lying east of the center of townships of range 62. Eight large canals have their head-gates in the proposed district. They have decrees for 2,933 cubic feet. This is a matter of the greatest

importance, as it is this strip of territory on which the great battle between the people and the superintendent of irrigation is fought. If the portion of the valley for forty miles east from the line above mentioned were in one district, it would be under the control of one man, who could not shift the responsibility. As things are now, the inefficiency of the commissioner in the upper district can militate against the very best endeavors of the commissioner in the lower district and of the superintendent, besides the fact that all the shortcomings are blamed on the latter party, who has no power to help himself and can neither suspend nor remove pending an investigation by the state engineer.

The demand for water has so increased within two years that my predecessor had only a premonition of the trouble, and, knowing the ratio, I hereby extend my sincere sympathies to my successor.

Another subject for the deliberations of the state legislators is the status of headgate keepers. They should be deputies of the water commissioner, subject to his orders and under bonds, but paid, of course, by the ditch companies. It should be discretionary with the commissioner or superintendent what ditches would come under these provisions.

It is impossible to guess, and there are no means of knowing, the actual or approximate volume of water in the Arkansas river at any point except at the United States gauging station at Canon City which is seventy miles from the upper end of the point where the great demand commences. I had forgotten that there is one more point, the state line. We do know that there is none at all there except for about forty days in June and July. The water officers know to a certainty the requirements of the different canals but have not the slightest idea what the supply may be in six hours or thirty-six. Gauging stations are an imperative necessity at not less than three points on the river. I could suggest one below the Fountain, one below the Huerfano and one below the head of the La Junta and Lamar canal. The

expense of maintaining them would be slight and the state engineer's corps could do the rating occasionally. The stations should be close to telegraph offices, and during the season of greatest fluctuations the superintendent should be notified regularly and as often as the exigencies might require.

Ditches up the river might be closed by reason of priorities further down, a good rain might fall at the latter place or at some place from which the waters would be carried so as to supply the ditch below even so much that it could not handle the water, or it might have a wash-out and be compelled to turn all the water down the river. If these facts could be known at the headgates of the upper ditches they could use the water at hand and benefit the country below by decreasing the flood so much. Also the order might be reversed, but in either case, a great deal might be gained. There is so much at stake in this valley that we cannot afford to allow any water to run down to Kansas that can possibly be utilized at home. The telephone line now being constructed in the valley must be taken advantage of and connections made with the heads of the principal canals before next fall, I predict.

As the law now reads, all ditches shall have rating flumes. There is no penalty and, with the exception of district No. 12, Mr. Hineman's ultimatum is, "No flume, no water." There are practically none in the division. It would be well to legislate in accordance with the above quotation.

Many consumers, especially under old ditches, use more water than necessary and unintentionally injure their lands. They say, "We are entitled to the water and will use it as we see fit." This is a hard thing to fight and to determine. If some definition or explanation of "beneficial use" could be had, many acres could be irrigated with water which are now wasted.

WATER SUPPLY—1893.

The winter and spring of 1893 were exceptionally dry and streams consequently low. This, with an increased demand for water caused by the lack of

moisture in the ground and larger area in cultivation, made things, to use a mild term, unpleasant for all parties concerned. The air was full of complaints for weeks.

On the night of May 14 the river rose in district No. 14 (Pueblo), and things ran smoothly in the valley until June 8. A shortage then commenced, lasting for two weeks. Local rains helped out until the beginning of August. After that time there was a shortage all the fall, except occasional rises of a few hours' continuance at certain points. Several large ditches had to be kept closed constantly.

During the season we had two parties arrested in district No. 14 and one in No. 17; all three for tampering with headgates. There were many other causes for arrest, but no evidence could be had. I had occasion to go to district No. 10, being requested to do so by the water commissioner, and we would probably have had trouble with the citizens, but a big rain came and removed the cause of the contention.

In 1894 the shortage was quite as apparent in the valley and more so in the mountain districts.

It has not been possible, up to the time of writing this, to get the tables of the discharge of the Arkansas at Canon City from the Geological Survey. From what I have been able to learn from Mr. Newell, who is in charge of this territory, it has been about an average of former years; so that what we have been terming a shortage is simply a largely increased demand. The usual supply of water has come but we did not realize it.

People who have not been particularly interested have no idea of the length of time required in the spring for water to fill river beds and the gravel and sand underlying the bottoms. A summer or fall rise makes a great deal better time.

The river rose in district No. 14 on May 20 and soon the ditch people felt good. By July 1 the shortage commenced to be felt. The ditches in proposed district No. 14, with appropriations of 2,900 cubic feet had only 1,640 feet, and on the 27th ditches enti-

tled to 1,452 cubic feet had been closed down. This shortage, with occasional intermissions, continued, of course gradually growing worse. On July 30 a gentleman who had been sending me cards daily, showing the stage of water, reported less than forty cubic feet per second at Nepesta and only two large canals between that point and Pueblo drawing water.

Mr. J. L. Prentiss, of the Royal Gorge Hot Springs hotel, reports daily the reading on the United States gauge at that place to Washington. He was kind enough to report to me, on cards furnished him for that purpose, the readings from May 1 to July 23. It is surprising how uniform they are. The lowest was 3.5 feet on May 5 and July 13. The highest was 5.8 on May 31 and June 6 and 8; 3.5 feet, May 1; 3.7 feet, May 8; 4.3 feet May 15, and 4.9 feet, May 22.

I made a visit to district No. 12 at the urgent solicitation of Mr. Hineman, the water commissioner, and others who were having trouble. We patched things up and no one was hurt. I also spent a hurried day in No. 15, trying to settle disputes.

The unprecedented high water of last June injured all ditches on the river more or less, requiring thousands of dollars to repair damages to head-gates, dams and banks. Mr. Newell was at Nepesta during the time and measured the river with his instrument. He says there were over 32,000 cubic feet per second flowing under the bridge. If such a "run off" could have been collected by reservoirs for twenty-four hours, there would have been sufficient to cover 169,000 acres to the depth of one foot, a strip of country seventeen miles square.

ODDS AND ENDS.

While looking over copies of decrees I found some interesting peculiarities. For instance:

One ditch has a total length of 400 feet; another 113 miles.

One has a decree for one-tenth of one cubic foot per second of time; another for 762 cubic feet.

One has been built to irrigate one acre of land; another to irrigate 155,000 acres.

One ditch is to have 1.5 cubic feet continuously from April 15 to and including May 1 and for six days of June in each year.

The courts have very different ideas of the "duty" of a cubic foot of water per second, ranging all the way from twenty to fifty acres to the foot. Experience teaches that the "duty" might be increased to seventy-five acres, probably.

NECESSITY FOR RESERVOIRS.

I will quote from an article I wrote one year ago. I am sorry I have not been able to obtain a record of discharge at Canon City for 1893 and 1894, so as to make a new calculation and include those two years in the average flow:

"According to Major Powell's statistics in report of the geological survey for 1889 and 1890, the volume of water in the Arkansas river, as measured at Pueblo in 1886 and 1887—i. e., the average of the two years—was, in cubic feet per second, as follows: May, 2,778; June, 4,523; July, 2,528; August, 1,599; September, 1,250. Measurements were taken at Canon City in 1888, 1889 and 1890, for those months, also April and October. A calculation from the proportional difference for the months for which we have data—viz., May to and probably including September—is probably nearly correct. This gives for April 1,349, and October 818 cubic feet. These figures give the 'run off,' as Mr. Powell terms it, west of Pueblo. The surplus discharge from the Fountain, St. Charles and Huerfano comes during the months of June and July, which is the flood season, and consequently is wasted and can cut no figure in our wants and supplies. The average of the above figures for the seven months, April to October, is 2,120. The average, not including June, is 1,720, and leaving out both June and July, the rainy season and high water months, the actual water available is only 1,560 cubic feet.

"But there is another side to this. There are wants, and those wants are backed up by the decrees of the district courts of Pueblo, Otero and Bent counties. Certified copies of those decrees, now in my possession, give the amount to be supplied by the Arkansas river alone, from the Bessemer ditch to the town of Las Animas, as 3,618 cubic feet per second. This has been supplemented since by 278 cubic feet by new decrees. We find that on the basis of seven months, mentioned above, the supply is now 59 per cent.; for six months 48 per cent.; for five months, which is the correct base to work upon, it is only 43 per cent. of the amount actually decreed by the courts for beneficial use.

• “There are the Otero and Holbrook in Otero county, capacity 850 cubic feet, and the Amity, Koen, Bedrock and at least half a dozen others in Prowers county, calling for at least as much more, making an aggregate of 1,700 more. These are not paper ditches, either, though, not having made proof, they are not on the records. They are in actual use and have been for two to ten years. I do not know the capacity of the Prowers county ditches, but am satisfied I am under-rating them. Assuming these figures to be correct, the percentages would be reduced to 50, 40 and 34 respectively.

“Besides these, there are paper ditches, which have plats and statements filed in the state engineer's office, requiring 4,372 cubic feet, and State Canal No. 1, the capacity of which is 605 cubic feet, in all 10,995, for which the visible supply is 1,560—a little over 14 per cent.

“The above figures being unquestionable, I wonder where the unappropriated water for State Canal No. 1 is to be found. The ditches mentioned above as not having made proof of priority are now taking steps to do so, and they, being in existence and operating, will all certainly antedate it.”

The Prowers county ditches alluded to have made their proof, which is now being considered by the referee and it is conceded by all parties that the awards will be 900 cubic feet at least, opinions ranging as high as 1,500 cubic feet. While on this subject I will state that your assistant, Mr. Preston, measured the river carefully in Pueblo, April 24, 1894. The discharge was 322.3 cubic feet and the river, we were told, had risen four inches during the previous forty-eight hours. The average depth was 1.7 feet.

Some people imagine that the water goes to waste during the winter months and could be stored in reservoirs. The fact is that there is no ditch in the lower Arkansas valley at this time, December 20, which would not be using water if it could be had. The water commissioner in district No. 14 is now in the active and continual discharge of duty. If there were 1,000 cubic feet more in the river, none would pass the west line of Bent county.

I have summed up the total discharges, as far as we have them, at Pueblo and Canon City, for 1889 and 1890 and 1891 and 1892. The averages are: January, 473 cubic feet; February, 466 cubic feet; March,

507 cubic feet; April, 1,349 cubic feet; May, 2,778 cubic feet; June, 4,523 cubic feet; July, 2,528 cubic feet; August, 1,599 cubic feet; September, 1,250 cubic feet; October, 453 cubic feet; November, 444 cubic feet; December, 405 cubic feet.

Any one of these is greater than Mr. Preston's measurement and examination will show that the above are almost all Canon City figures, so the inference is that the seepage between those points is small. I do not think I am very far wrong in estimating, from a study of the tables for the other years, that the smallest discharge mentioned above—i. e., the 3.5 feet reading—will afford less than 300 cubic feet, not quite half enough to supply the proposed State Canal No. 1. The water coming through the Grand canon is the main source of supply for the Arkansas valley. Any small stream would be more than overbalanced by the several ditches between the points mentioned.

W. C. Burke, receiver of the La Junta and Lamar canal, to whom I wrote, asking him to revise his estimate of the percentage of his appropriation used by him, wrote me that he "figured on ten months' run and that there are probably 5,000 acres of alfalfa which are irrigated only once a year, in the fall, and 5,000 which are irrigated in the fall and once again in June. The grain crop is made during the months of May and June—that is, the small grain—and the corn and the root crop is carried through the balance of the season by rotating the waters, certain divisions receiving a full head of water for four or five days, when it passes to another division. By this method I furnished water to make a crop on 45,000 acres."

I cannot help believing that some modification of the California Wright law, perhaps one similar in many respects to the bill introduced last session by Mr. Gordon, of Pueblo, the proper thing at this time. The internal improvement fund was intended for just such purposes, but the people of southern Colorado had better learn at once, what they will learn eventually, that they must build reservoirs themselves.

The report of the Geological survey gives a list of reservoir sites. Leaving out small ones, there are different places therein described, above the mouth of the Huerfano, with catchment basins aggregating 3,200 square miles, capable of containing, if dammed, over 510,000 square feet; on the Apishapa, 470 square miles and 3,900 acre feet; on Timpas creek, seventy-five square miles and 14,000 acre feet; on the Purgatoire, 3,050 square miles and 118,000 acre feet; on Rule creek, 250 square miles and 59,000 acre feet. The two latter could be used for districts No. 19 and 67 only; the others locally and in districts No. 14 and 17. These totals are immense. The Apishapa figures seem disproportionate and one of them may be a typographical error.

According to the state auditor's report of 1892, there are in Otero, Bent and Prowers counties, 403,000 acres of agricultural land with an assessed valuation of \$1,339,000. This does not include 82,000 acres of state land in Otero county and about 25,000 in Bent and Prowers counties.

There are reservoir sites enough to contain all the water required in District No. 67 on the Purgatoire and its tributaries. The flood waters from this area now go to the Mississippi. While on the subject of district No. 67, I will state that one of the canals there, the Amity, which has not yet had an appropriation decreed, made proof before the referee that they had 4,096 acres of alfalfa and 14,500 of other crops growing. They erected a headgate and dam last winter costing \$22,000.

With the hope that some of the suggestions herein may bear fruit and benefit the citizens of the valley, and with the knowledge that I have faithfully performed my duty, I respectfully submit the enclosed, as required by law.

WM. MATTHEWS,

Superintendent of Irrigation Division No. 2.

Rocky Ford, Colorado, December 20, 1894.

SUPPLEMENT TO MR. MATTHEWS' REPORT.

C. B. Cramer, State Engineer:

Sir—Since forwarding the above report, I found a copy of the Geological Survey tables of the discharge at Canon City for the years 1893 and 1894, they having just been received in your office. It is not possible now to change the averages given above, but I give here the averages of these two years and any one interested can easily compare them:

January, 459 cubic feet; February, 476 cubic feet; March, 530 cubic feet; April, 615 cubic feet; May, 1,720 cubic feet; June, 2,909 cubic feet; July, 1,194 cubic feet; August, 642 cubic feet; September, 514 cubic feet; October, 297 cubic feet; November, 256 cubic feet.

It is worthy of notice that the volume of water at Pueblo, as measured by Mr. Preston on April 24, was 332 cubic feet, and the volume at Canon City on the 22nd and 23rd (allowing about 24 hours for time in transit), was 650 and 730 respectively. Only one large canal, the Bessemer, was running, and it had only eighty feet. The "increase by seepage" theory works the wrong way here.

WM. MATTHEWS,
Superintendent of Irrigation Division No. 2.
Denver, Colorado, December 22, 1894.

SUMMARY OF TOTALS OF DISTRICTS, DIVISION NO. 2.

DISTRICT AND STREAM OR COUNTY	Length of ditches in miles	Av. length of ditch in miles	Average days water car- ried, 1894	Average wa- ter carried in cu. ft.	Am't decreed in cu. ft.	Perc't. of de- creed used	Acres of al- talia	Acres of seed- ed grass	Acres of nat- ural grass	Acres of fruit	Acres of other crops	Acres irri- gated from s'page	Acres irri- gated	Acres can be irrigated	Prc't. of what is & can be ir	No. of ditches in district	No. reported on by com.
No. 10—Fountain ----	68.5	d	a	a	495	d	2,420	220	2,940	206	1,510	a	7,296	a	a	111	26
Its tributaries-----	a	a	a	a	f	d	300	a	400	20	1,230	a	4,256	a	a	f	f
No. 11—Chaffee Co.---	e	e	e	e	678	e	e	e	e	e	e	e	e	e	e	138	e
No. 12—Fremont ----	302.8	1.22	74.6	.85	677	d	3,703	860	2,770	502	5,690	341	13,860	16,839	82	418	235
No. 13—Custer -----	256.7	.57	48.2	.98	663	65	134	425	17,268	b	6,797	80	24,704	24,000	100	473	446
No. 14—Pueblo -----	289.5	8.77	16.8	29.28	2,220	42	19,010	525	8,570	1,416	31,980	640	62,141	15,890	39	48	33
No. 15—St. Charles Cr.	106.7	2.09	206.6	1.89	204	d	1,758	65	691	106	827	a	3,447	3,810	90	108	51
No. 16—Huerfano ----	179.1	1.79	d	2.58	745	d	2,830	a	2,240	36	2,108	a	7,214	12,755	56	158	100
No. 17—Otero & Bent g	283.0	141.50	183.7	179.70	1,883	53	32,125	a	380	915	41,100	a	119,973	226,610	53	20	9
No. 18—Apishapa Cr..	e	e	e	e	99	e	e	e	e	e	e	e	e	e	e	8	e
No. 19—Purgatoire ---	152.5	a	a	a	716	d	7,260	a	3,620	25	6,690	a	17,595	24,620	72	95	61
Totals.. -----	1,638.8	-----	-----	-----	8,380	----	69,540	----	-----	3,226	97,932	----	260,486	-----	----	1,574	961

a—Commissioner's report does not give figures.

b—Climate not suitable.

d—Could not estimate from data in commissioner's report.

e—No detailed report.

f—Included in line above.

g—The ditches not reported do not aggregate 50 cubic feet.

SEVENTH BIENNIAL REPORT

NAME OF DITCH OR CANAL	Length in miles	Cu. ft. decreed	No. days water carried	Av. amt. water carried, cu. ft.	No. acres can be irrigated	Acres of alfalfa	Acres of wild hay	Acres of other crops	Acres of fruit	Acres irrigated from seepage	Total acres irri- gated	Supt., 1893	Supt., 1894	Repairs, 1893	Repairs, 1894	Permanent im- provement, not repairs
Rocky Ford	14	208	300	120	8,500	3,670	330	1,830	114	---	5,944	\$ 400	\$ 400	\$ 650	\$ 800	\$5,000
Catlin	36	345	360	220	20,000	6,950	---	7,480	448	---	14,878	900	900	1,100	1,500	1,000
La Junta and Lamar	113	762	270	254	155,000	18,000	---	27,000	120	---	45,120	5,280	5,280	6,000	5,000	---
Lagyna b	26	155	a	a	25,000	1,460	---	2,940	100	---	4,500	1,170	1,400	500	1,500	1,200
Otero b	52	123	90	150	8,000	c	c	c	c	c	c	c	c	c	c	---
Potter	5	12	90	9	600	125	50	150	2	---	327	---	---	---	---	825
Rocky Ford High Line	80	418	92	300	33,440	4,658	46,032	12,810	528	640	24,668	2,800	3,000	4 700	5,300	500
Colorado Canal	60	756	143	a	75,000	8,000	---	11,900	61	---	19,961	---	2,250	---	5,000	---
Oxford Farmers	14	163	270	100	5,856	2,100	300	1,900	275	---	4,575	410	410	1,800	2,500	---
Jones	10	44	50	30	3,500	520	---	350	30	---	900	---	---	---	2,000	---
Riverside	12	80	70	50	4,200	1,050	---	1,050	75	---	2,175	---	200	---	350	---
Town	8	38	240	25	1,800	350	---	300	26	---	675	---	125	---	3,000	---
Arkansas Valley	---	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Totals	430	3,174	---	---	340,906	46,883	6,712	67,710	1,779	640	123,724	---	---	---	---	---

a—Fluctuations caused by floods so great that no estimates could be made.

b—Only partial decree granted. Capacity of both, 850 cubic feet.

c—Superintendent reports that he does not know.

d—Must be upland grass if anything.

STATEMENT

SHOWING NUMBER OF DITCHES, PRIORITIES, APPROPRIATIONS, ETC.

DISTRICT AND COUNTY OR STREAM	Number of ditches	Number of priorities	Approp'n in Cubic Ft.			Average Cu. Ft. to Each D'ch
			Ar- kansas	Tribu- taries	Total	
No. 10, Fountain <i>a</i>	111	145	-----	495	495	4.46
No. 11, Chaffee county	138	190	85	593	678	4.92
No. 12, Fremont county <i>b</i>	415	415	230	447	677	16.30
No. 13, Custer county	473	652	-----	663	663	1.42
No. 14, Pueblo county	48	53	2,119	101	2,200	46.25
No. 15, St. Charles	108	203	-----	204	204	1.88
No. 16, Huerfano	158	197	-----	745	745	4.71
No. 17, Arkansas	20	21	1,783	100	1,883	94.00
No. 18, Apishapa	8	13	-----	99	99	12.43
No. 19, Purgatoire	95	104	-----	716	716	7.53
Totals	1,574	1,993	4,217	4,163	8,380	5.33

a—The decrees for this district read for water for certain numbers of acres. I found the cubic feet by allowing the usual quantity, i. e., one foot to fifty acres.

b—For 170 of these ditches the court granted an amount of water for stated period, in fact a system of rotation. For the purpose of this calculation I presumed, from careful readings, that one day out of three would be nearly correct, and deducted two-thirds from the aggregate amount decreed to these 170 ditches.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 10, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. W. PATTON.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
North Side Ditch	Rock creek	Jan. 31, 1893	Nov. 11, 1892	26.40	..... Charter Oak Live Stock and Land Co.
The Roby Feeder to Lincoln Ditch.	Fountain creek	April 29, 1893	Feb. 2, 1893	16.00	..... Frank R. Roby
Hancock Ditch	East Beaver creek	June 28, 1893	Jan. 26, 1892	10.00	..... C. H. Hancock
Kinnikinic	South Ruxton creek	Oct. 10, 1893	Oct. 2, 1893	1.90	..... William Hook, Jr.
Dark Canon	South Ruxton creek	Oct. 10, 1893	Sept. 28, 1893	1.90	..... Nellie Keith
Sand Creek Underdrain Ditch	Sand creek	Dec. 9, 1893	Nov. 6, 1893	7.50	..... C. J. Miller
Clark Ditch	Fountain creek	Dec. 12, 1893	April 1, 1861	.....	..... F. A. Smith and A. Bounell
The Slough Ditch	Slough and springs	May 17, 1894	May 16, 1894	8.82	..... G. N. Crabb and A. D. McGooney
Monument Pipe Line	Monument creek	May 23, 1894	Mar. 3, 1894	47.30	..... City of Colorado Springs
Stevens Ditch	West Mon'm't creek	Sept. 24, 1894	June 22, 1894	3.00	..... John Stevens

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 10, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANT'S
North Side Reservoir	Rock creek	North Side ditch	Jan. 31, 1893	Nov. 11, 1892	1,400,000	{ The Charter Oak Live Stock and Land Co.
Colorado Springs Water W'ks Reservoir No. 8	{ East Fork West Beaver creek }	Built on stream	Nov. 27, 1893	Aug. 31, 1893	63,000,000	-----City of Colorado Springs
Storage Reservoir No. 2	Middle Beaver creek	Built on stream	Nov. 29, 1893	Sept. 1, 1893	12,000,000	-----City of Colorado Springs
Miller Reservoir	Ravine	Feeder to same	Dec. 9, 1893	Nov. 6, 1893	2,600,000	-----C. J. Miller
Pike View Reservoir No. 1	Monument creek	{ Monum't pipe line }	May 23, 1894	Mar. 5, 1894	9,600,000	-----City of Colorado Springs
Pike View Reservoir No. 2	Monument creek	{ Monum't pipe line }	May 23, 1894	Feb. 27, 1894	2 300,000	-----City of Colorado Springs

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 11, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, RICHARD DEVEREUX.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
The Pulp Mill Ditch.....	Cottonwood creek.....	Dec. 8, 1892	Sept. 19, 1892	45.00	..... The Denver Paper Mill Co.
Klease Ditch.....	Arkansas river.....	Dec. 8, 1892	Sept. 20, 1892	13.64	..... John Klease et al.
Cox Ditch.....	Morrison creek.....	May 22, 1893	May 16, 1893	2.60	..... H. F. Cox
Condon & Henthorn Ditch.....	Half Moon creek.....	Sept. 25, 1893	Sept. 15, 1893	27.00	..... Condon & Henthorn
Flitner Ditch.....	No Name creek.....	Oct. 4, 1893	Sept. 23, 1893	4.37	..... David Flitner
O'Hanlon Ditch.....	North Cottonw'd cr.	May 4, 1894	Aug. 2, 1881	8.00	..... H. Jean Withering
Pueblo and Otero County Line Ditch.....	Arkansas river.....	May 5, 1894	Feb. 6, 1894	35.00	..... S. Hartig et al.
Pritchard Ditch.....	Middle Cottonw'd cr.	May 7, 1894	April 16, 1888	8.00	..... J. H. Pritchard
Bateman Ditch.....	Spring.....	June 20, 1894	May 1, 1890	2.00	..... Susan Bateman
Newcomb Ditch.....	North Cottonw'd cr.	June 22, 1894	June 13, 1894	{ 320 stat- ute in. }	..... J. P. Newcomb
Wade Ditch.....	North Cottonw'd cr.	June 15, 1894	June 4, 1894		..... Paralee Wade
The Revel Ditch.....	Middle Cottonw'd cr.	Aug. 28, 1894	June 4, 1894	12.61	..... Joseph I. Revel and Josiah T. Bray
The Newcomb Ditch.....	Four Mile creek.....	Sept. 10, 1894	May 7, 1883	.29	..... John P. Newcomb
The Saguache Ditch.....	Arkansas creek.....	Nov. 14, 1894	-----	300.00	Twin Lakes Consolidated Placer Mining Co.

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 11, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The Empire Reservoir.....	Springs	Springs	Dec. 3, 1892	Aug. 23, 1892	4,000,000	----- The Leadville Water Co.
Twin Lakes State Reservoir...	{ Twin Lakes creek, Willis creek and other streams.... }	Built on stream.	June 12, 1893	May 27, 1893	1,000	{ C. B. Cramer, F. A. McJister and D. H. Nichols, Board of Control.
Twin Lakes Reservoir's Nos. 1 & 2	{ Twin Lakes creek and other streams }	Built on stream.	June 12, 1893	Mar. 20, 1893	517,007.740 1,568,160,000	{ The Twin Lakes Reservoir, Storage and Canal Co.
State Reservoir, Boss Lake.....	Lake fork	{ Built on stream } and lake.... }	July 12, 1894	May 20, 1893	30,000,000	.. People of the State of Colo.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 12, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. T. SANDERS.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Caughman Ditch No. 1	Texas creek	Jan. 23, 1893	May 12, 1880	2.44	Seaborn Caughman
Caughman Ditch No. 2	Texas creek	Jan. 23, 1893	May 10, 1887	2.28	Seaborn Caughman
Reed Ditch No. 1	Texas creek	Jan. 23, 1893	April 30, 1880	3.90	Harry G. Reed
Reed Ditch No. 2	Brush creek	Jan. 23, 1893	Jan. 1, 1889	5.13	Harry G. Reed
The Beddoes Ditch	Texas creek	Jan. 23, 1893	April 10, 1882	4.02	Helena M. Beddoes
Vahldick Reservoir Ditch	Greenleaf creek	Feb. 2, 1893	Nov. 11, 1892	5.00	Frederick Vahldick
The Texas Creek Ditch	Texas creek	Feb. 6, 1893	Nov. 10, 1892	7.50	Richard Houl et al.
Neely Ditch		Feb. 25, 1893	Nov. 15, 1882	2.03 3.71	B. G. Scott
Durfee Exten. of Bridge No. 3 Ditch		Feb. 27, 1893	July 23, 1892	1.20	Alfred Durfee
Pleasant Valley Ditch	Arkansas river	Mar. 16, 1893	Mar. 2, 1893	15.34	L. P. Morrison et al.
Adams' Ditch	Greenleaf creek	May 12, 1893	April 24, 1893	2.50	John Adams
Niles Ditch	South Brush creek	May 12, 1893	May 5, 1893	2.50	John Adams
Smith's Park Ditch	Smith's Park creek	May 28, 1894		1.00	J. C. Lees
Altman and Victor Pipe Line	West Beaver creek	June 14, 1894	May 4, 1894	3.69	D. McShane

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 12, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Vahldick Reservoir No. 1.....	Greenleaf creek.....	Feeder to same	Feb. 2, 1893	Nov. 9, 1892	212,500	..... Frederick Vahldick
Vahldick Reservoir No. 2.....	Greenleaf creek.....	Feeder to same	Feb. 2, 1893	Nov. 9, 1892	175,000	..... Frederick Vahldick
Vahldick Reservoir No. 3.....	Greenleaf creek.....	Feeder to same	Feb. 2, 1893	Nov. 9, 1892	50,000	..... Frederick Vahldick
The Texas Creek Res. No. 1...	Texas creek.....	Texas creek d'ch	Feb. 6, 1893	Nov. 10, 1892	3,400,000	..... Richard Houl et al.
Adams' Reservoir.....	Greenleaf creek.....	Adams' ditch....	May 12, 1893	April 24, 1893	430,000	..... John Adams
Niles' Reservoir.....	South Brush creek..	Niles' ditch.....	May 12, 1893	May 5, 1893	430,000	..... John Adams

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 13, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, L. A. HINEMAN.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Mill Ditch No. 3.....	Grape creek.....	Feb. 8, 1893	May 1, 1892	2.00	M. Howard and J. C. Lees
Schmidt & Dieckmann Ditch.....	Horn creek.....	April 10, 1893	July 15, 1892	2.52	Not stated
Swift Creek Ditch.....	Swift creek.....	Aug. 18, 1893	June 3, 1891	3.00	James Splawn
Beaver Ditch.....	Grape creek.....	Nov. 25, 1892	Oct. 30, 1893	.83	William Knuth
Cottonwood No. 3 Ditch.....	Cottonwood creek ..	Feb. 19, 1894	May 5, 1891	2.40	John L. Schwab
John L. Schwab Feed Ditch.....	Antelope creek.....	Feb. 19, 1894	Sept. 26, 1893	1.85	John L. Schwab
Conrad Abt Ditch No. 1.....	Frose creek	May 4, 1894	Aug. 29, 1893	2.50	Conrad Abt
Conrad Abt Ditch No. 2.....	Frose creek	May 4, 1894	Aug. 29, 1893	2.50	Conrad Abt
Conrad Abt Ditch No. 3.....	Frose creek	May 4, 1894	Aug. 29, 1893	2.50	Conrad Abt
Charles Schuly No. A Ditch	Colony creek.....	Aug. 13, 1894	May 15, 1894	3.50	Charles Schuly

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 13, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Swift Creek Reservoir No. 1 ---	Swift creek -----	Swift creek ditch	Nov. 18, 1893	June 27, 1893	1,530,672	----- Richard Houle et al.
Swift Creek Reservoir No. 2 ---	Swift creek -----	Swift creek ditch	Nov. 18, 1893	June 27, 1893	1,277,600	----- Richard Houle et al.
Swift Creek Reservoir No. 3 ---	Swift creek -----	Swift creek ditch	Nov. 18, 1893	June 28, 1893	1,329,434	----- Richard Houle et al.
Reed Reservoir No. 1 -----	Methug draw - ----	Built on draw ---	Nov. 21, 1893	-----	5,323,774	----- N. G. Reed
Reed Reservoir No. 2 -----	Methug draw -----	Built on draw ---	Nov. 21, 1893	-----	2,397,542	----- N. G. Reed
John L. Schwab Reservoir No. 1	Antelope creek -----	{ John L. Schwab } { ditch ----- }	Feb. 19, 1894	Sept. 26, 1893	549,216	----- John L. Schwab
John L. Schwab Reservoir No. 2	Antelope creek -----	{ John L. Schwab } { ditch ----- }	Feb. 19, 1894	Sept. 26, 1893	694,836	----- John L. Schwab

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 14, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, I. B. GOULD.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Pinon Springs Water Supply.....	} Reservoirs, springs } } and seepage..... }	Mar. 6, 1893	Dec. 3, 1892	100.00	..... S. B. Strang et al.
Mortensen Ditch.....	Red creek	Jan. 10, 1894	Nov. 20, 1893	3.00	..... Hans Mortensen
Warren, Barnes & Baxter Ditch.....	Arkansas river.....	Feb. 7, 1894	Spring, 1861	15.00	..... The Orchard Grove Ditch and Res. Co.
Shaffer Ditch	Arkansas river.....	Feb. 9, 1894	Nov. 11, 1893	2.00	..... Mike Shaffer
The Lincoln Ditch.....	{ Fontaine Qui la } { Bouille	Sept. 10, 1894	Jan. 1, 1887	3.50	..... Andrew McClelland

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 14, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The B. & B. Reservoir	Six Mile arroyo	Built on arroyo ..	Jan. 23, 1894	Oct. 24, 1893	4,587,840	..... George B. Blackford
Peter Mueller	Booth ditch	Feeder to same ..	Nov. 26, 1894	Nov. 7, 1894	385,953	..... Peter Mueller
D. O. Hill	Booth ditch	Feeder to same ..	Nov. 26, 1894	Feb., 1886	54,450	..... D. O. Hill

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 15, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, G. P. HARCRODE.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Bruce Ditch.....	Greenhorn	July 16, 1894	May 1, 1894	15.00	.....Edwin S. Bruce

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 15, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Bruce Reservoir.....	Greenhorn	Bruce ditch	July 16, 1894	May 1, 1894	11,325,600	..... Edwin S. Bruce

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 16, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, I. C. DECAMP.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
John Gribble Ditch.....	Wataloya creek.....	Dec. 17, 1892	April 3, 1888	6.23	.....J. J. Petrie and J. Cummings
Bustos Ditch.....	Bear creek.....	Dec. 26, 1892	June 15, 1878	9.00	.....John Lowenbrack
Galban Ditch.....	Bear creek.....	Dec. 26, 1892	April 10, 1882	9.30	.....John Lowenbrack
The La Veta Canal & Res. Co.'s Canal	Cucharas river.....	Jan. 7, 1893	June 28, 1892	612.00	.....The La Veta Canal and Reservoir Co.
The La Veta Canal & Reservoir Co.'s Lateral No. 1.....	Bruce canon.....				
" No. 2.....	Indian creek.....				
" No. 3.....	Oak creek.....				
" No. 4.....	Middle creek.....				
" No. 5.....	South Abeyta.....				
" No. 6.....	North Abeyta.....				
" No. 7.....	Cucharas river.....				
Gongales Ditch.....	Huerfano river.....	Jan. 9, 1893	May 10, 1881	4.61	.....Jacinta Gongales
The Creager Ditch.....	Bruff creek.....	Feb. 23, 1893	Mar. 1, 1888	2.50	.....John G. Creager
The Naranjo Ditch.....	Greaser creek.....	Mar. 9, 1893	May 1, 1883	3.00	.....Jose T. Martinez and M. P. Naranjo
The Lapare Ditch.....	Middle Turkey creek	Mar. 17, 1893	April 1, 1892	5.61 ^a	.....Antonio A. Lapare and Juan D. D. Ortibes

The Story Ditch.....	Story creek.....	April 6, 1893	April 15, 1876	.....	John Story
Montoya Ditch.....	Turkey creek.....	May 30, 1893	Feb. 12, 1880	7.56	Victor Montoya
Henry Strange Ditch.....	Apache creek.....	June 2, 1893	April 15, 1873	27.50	John Palmer
Luna Ditch.....	Oak creek.....	June 2, 1893	April 1, 1892	6.66	Nicolas Luna and Wm. H. Clements
Cucharas Canal.....	Cucharas river.....	July 7, 1893	April 8, 1893	173.55	L. W. Burtch et al.
Silva Ditch.....	Turkey creek.....	Sept. 16, 1893	April, 1870	8.00	Victor Montoya
Rogers' Ditch.....	Santa Clara creek.....	Sept. 29, 1893	April, 1874	2.00	Thomas Rogers
Farmer's Ditch.....	Huerfano river.....	Oct. 3, 1893	Aug. 29, 1893	30.00	Charles R. Griffin et al.
Welton Canal Enlargement.....	Huerfano river.....	Dec. 11, 1893	Nov. 22, 1892	31.60	Juniata Canal and Milling Co.
Arnold Ditch No. 1.....	Santa Clara creek.....	Jan. 19, 1894	May 1, 1891	15.93	Walter M. Arnold and Alice M. Unfug
Arnold Ditch No. 2.....	Santa Clara creek.....	Jan. 19, 1894	June 1, 1892	9.56	Walter M. Arnold and Alice M. Unfug
Simons' Ditch.....	.....	Jan. 31, 1894	1880	2.00	A. D. Simons
Shoomaker & Manzey Underflow } Ditch	Huerfano river.....	April 20, 1894	Sept. 25, 1891	14.50	Josephine Shoomaker and W. A. Mauzey
Echo Ditch.....	Echo creek.....	April 30, 1894	May 17, 1891	12.00	Alexander McDonald and John Dick, Jr.
The Truogilla Ditch.....	Cucharas creek.....	May 24, 1894	1870	9.00	Maria B. Truogilla
The Spielmann Underflow Ditch.....	Indian creek.....	June 2, 1894	Mar. 12, 1894	4.00	Charles Spielmann

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 16, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 1..	See source of canal } and laterals	Feeder to same..	Jan. 7, 1893	Sept. 28, 1892	21,648,000 }	The La Veta Canal and Reser- voir Co.
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 2..					24,000,000 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 3..					57,498,067 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 4..					10,889,333 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 5..					8,712,000 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 6..					59,925,000 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 7..					43,822,400 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 8..					50,964,000 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 9..					217,800,000 }	
The La Veta Canal and Reser- voir Co.'s Reservoir, No. 10..					32,676,666 }	

The La Veta Canal and Reservoir Co.'s Reservoir, No. 11.	See source of canal and laterals	Jan. 7, 1893	Sept. 28, 1892	34,581,333	The La Veta Canal and Reservoir Co.
The Creager Reservoir	Bruff creek	Feb. 23, 1893	Mar. 1, 1888	3,133,000	John G. Creager
Cucharas Reservoir, No. 1.	Cucharas river	July 7, 1893	April 8, 1893	25,844,449	I. W. Burtch et al.
" " No. 2.				108,829,254	
" " No. 3.				123,457,084	
" " No. 4.				405,262,628	
" " No. 5.				164,904,684	
" " No. 6.				756,556,486	
" " No. 7.				202,324,817	
" " No. 8.				89,535,666	
Juniata Canal and Milling Co.'s Reservoirs No. 1.	Huerfano river	Dec. 11, 1893	Nov. 22, 1893	12,893,760	Juniata Canal and Milling Co.
" " No. 2.			Nov. 22, 1893	30,660,240	
" " No. 3.			Jan. 24, 1893	27,965,520	
" " No. 4.			Jan. 24, 1893	159,690,960	
Feeder to same					
Creager ditch					
Cucharas canal					
Welton canal					

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 17, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, GEO. PECK.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Lolita Ditch	Horse creek	Dec. 1, 1892	Sept. 15, 1892	15.00	Martin Royer
Wait Ditch	Horse creek	Dec. 21, 1892	Sept. 28, 1892	66.00	B. F. Green and A. R. Wait
Liptrap Ditch No. 1	Buffalo creek	Jan. 18, 1893	Dec. 12, 1892	2.70	Lee Liptrap
Liptrap Ditch No. 2	Buffalo creek	Jan. 18, 1893	Dec. 12, 1892	2.70	Lee Liptrap
Todd Water Canal	Horse creek	Mar. 8, 1893	Mar. 1, 1893	100.00	R. Phillips
Lolita Ditch of Transfer, Enlargem't	Horse creek	April 11, 1893	-----	-----	{ Martin Royer to Thos H. Fisher and A. R. Wait.
Todd Water Canal	Horse creek	April 15, 1893	-----	500.00	R. Phillips
W. J. Barker's Ditch—add. statem't	Arkansas river	May 13, 1893	Oct. 20, 1890	15.15	W. J. Barker
Lauckton Ditch, Enlargement	King arroyo	Aug. 30, 1893	June 1, 1893	15.06	George M. Lauckton
Anderson Ditch, Enlargement	Crooked arroyo	Aug. 30, 1893	June 1, 1893	15.00	A. J. Anderson
King Arroyo Ditch	King arroyo	Dec. 22, 1893	Sept. 25, 1893	3.64	Orrin Gemmill
The Eddleman Ditch	Springs and seepage	Mar. 20, 1894	Mar. 6, 1894	3.00	Moses W. Eddleman
Prairie Ditch	Horse creek	April 24, 1894	June 22, 1894	36.48	F. R. Phillips

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 17, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANT'S
Moore's Reservoir	Hover's draw	Built on gulch ..	July 3, 1893	April 26, 1893	100,000,000	{ Avery Moore and George S. Hill
Reservoir No. 1	Arkansas river.....	The Lake canal.	May 19, 1894	Nov. 14, 1893	324,268,250	-----The Laguna Canal Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 19, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. N. TURNER.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
San Isidro Ditch	Purgatoire	Aug. 13, 1894	May 15, 1894	13.68	-----Robert M. Beach and Abundo Sandoval
Enlargement of El Moro and Chi- coza Ditches	Purgatoire	Aug. 14, 1894	Mar. 16, 1894	4.70	-----A. E. M. Beshoar

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 49, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Winkler Ditch	Republican river	July 30, 1894	April 18, 1894	10.16	.....Solomon Winkler

STATEMENT CONCERNING DITCHES.

IN WATER DISTRICT NO. 67, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Fort Lyon Ditch.....	Arkansas river.....	Dec. 19, 1892	Jan. 5, 1892	20.00	..... John O'Connell
Fort Lyon Ditch Feeder.....	Waste and seepage..	Dec. 19, 1892	May 6, 1892	20.00	..... John O'Connell
Cameron Ditch.....	Big Sandy creek....	Jan. 18, 1893	Dec. 19, 1892	7.50	..... John Cameron
Hyde Ditch Co.'s Ditch.....	Arkansas river.....	Feb. 22, 1893	{ Feb. 16, 1893 } { May, 1887 }	60.00	..... The Hyde Ditch Co.
Lynch Canal.....	Clay creek.....	April 26, 1893	Feb. 1, 1893	3.00	..... Peter S. Lynch
N. R. New Ditch.....	Seepage.....	June 21, 1893	Feb. 24, 1893	3.75	..... N. R. New
The Brown Ditch.....	Wild Horse creek....	Jan. 30, 1894	Oct. 31, 1893	2.88	..... M. M. Brown
Keesee Ditch.....	Arkansas river.....	Feb. 16, 1894	Mar. 13, 1871	22.00	..... Dan Keesee
Cheyenne Ditch.....	Big Sandy.....	April 30, 1894	-----	13.00	..... Elizabeth P. Slattery
Cottonwood Ditch.....	Cottonwood arroyo..	July 10, 1894	Mar. 30, 1894	5.00	..... William F. Cross

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 87, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
King Reservoir	Arkansas river.....	{The La Junta and Lamar canal.....}	Dec. 6, 1892	Sept. 8, 1892	815,782,041	La Junta & Lamar Canal Co.
Lynch Reservoir.....	Clay creek		April 26, 1893	Feb. 1, 1893	1,760,000	.....Peter S. Lynch

Chapter IV.

IRRIGATION DIVISION No. 3—RIO GRANDE DIVISION.

Del Norte, Rio Grande County, Colo.

November 15, 1894.

Hon. Charles B. Cramer, State Engineer, Denver, Colo.:

Dear Sir—I have the honor to submit the following report from water division No. 3, state of Colorado: Water division No. 3 includes all water districts consisting of lands watered from the Rio Grande river and its tributaries. Division No. 3 embraces water districts numbered 20, 21, 22, 24, 25, 26, 27 and 35.

The water commissioners of the various districts have submitted the following reports:

Water district No. 20—James Warnock, Alamosa, Colorado, water commissioner No. 20, reports for 1893 that he was called out on the 6th day of May and served ninety-eight days; employed two assistants, one serving forty-four days and the other thirty-five days. Mr. Warnock reports a great scarcity of water in the district this season, but having crops on an average as good as in former years. He has been unable to have headgates placed on ditches on the smaller streams and without them he is unable to distribute water in conformity with the decrees. No statistical report from this district. This is the largest water district in this division and requires much care and attention.

Mr. Warnock reports as follows for 1894: Served ninety-eight days and employed several assistants for a few days each. The Rio Grande river ran very low late in the season.

District No. 21—Joseph S. Pursley, La Jara, Colorado, commissioner No. 21, reports as follows for 1893: Water district No. 21 consists of all lands watered by the La Jara and Alamosa creeks and their tributaries. Mr. Pursley was called out May 29 and served eighty-six days. He employed one assistant for fifty-one days and another for five days. There was a scarcity of water a portion of the season, with crops at about an average, notwithstanding. He reports 190.75 miles of ditches, carrying an average of 712 cubic feet of water per second; 1,912 acres of alfalfa, 445 acres of seeded grasses, 39,929 acres of natural grasses, 7,522 acres in other crops and seventy-four acres irrigated by seepage. Mr. Pursley reports having served ninety-two days during 1894. Water was very scarce and many new and intricate questions were raised in regard to the laws of irrigation and as to the rights of water consumers.

District No. 22—Consists of all lands irrigated by ditches taking water from the Conejos river and its tributaries. J. C. Dalton, Manassa, Colorado, commissioner No. 22, reports for 1893 as follows: Was called out on the 16th day of May and served sixty-four days. Employed two assistants, one serving thirty-eight and the other thirty days. A fair supply of water and good crops. No statistical report. Mr. Dalton served 172 days in 1894; had one assistant thirty-five days and another twenty-one days. Water was very scarce and some very complicated questions were presented for him to answer.

District No. 24—Consists of lands watered from the Culebra and Costilla creeks. J. P. Sauchez, San Luis, Colorado, commissioner No. 24, reports for 1893 that he was called out in the latter part of June and served forty-two days. He secured the arrest and conviction of four parties who persisted in disobeying his orders in regard to keeping headgates closed when

they were not entitled to water. He also reports a fair supply of water during the year 1894, in which he served thirty-eight days.

District No. 25—Consists of all lands irrigated by water taken from the San Luis creek, Sand or Medano creek, Big Spring and Little Spring creeks, North Zapato, South Zapato, Middle, Bear and Sierra Blanco creeks and all other streams between said Sand or Medano creek and the said Sierra Blanco creek. John Kinney, Mosca, Colorado, commissioner No. 25, reports for 1893, not having qualified or discharged the duties of his office until late in the season, but such duties were very ably performed by Tom I. Atwood, who had filled the position of assistant under the former commissioner. Mr. Kinney reports having served only nine days and his assistant, E. E. Baker, of Saguache county, twenty days during this year. Water scarce in the latter part of the season.

District No. 26—Consists of all lands irrigated from ditches taking water from the Saguache creek and its tributaries. J. W. Ellis, Saguache, Colorado, commissioner No. 26, reports for 1893 having been called out on June 6 and served seventy-one days. One assistant served fourteen days and another seven days. None of the ditches have legal headgates, and no locks are supplied for the kind of gates in use. He also reports a number of feasible sites for the construction of reservoirs along the course of the Saguache creek. He also urges the superintendent of irrigation and state engineer to use all reasonable influence possible to secure the early completion of the Saguaches state reservoir, believing it to be a practical undertaking from which the valley will derive much benefit. During 1894 Mr. Ellis served sixty-four days during the early part of the season. He then resigned and C. A. Potts, of Saguache, was appointed and served eighty-seven days. Mr. Potts reports the Saguache reservoir as nearly completed.

District No. 27—Consists of all lands watered from ditches taking water from Carnero, La Garita and Tuttle creeks and their tributaries. Mark Bei-

dell, La Garita, Saguache county, Colorado, commissioner No. 27, reports for 1893 that he was called out on May 25 and served twenty-four days. Water scarce late in the season but crops were not seriously injured by drouth in any portion of his district. He also reports a number of good sites for reservoirs that could be constructed at a small outlay of money along the courses of La Garita and Carnero creeks. During 1894 he served thirty-five days, a great scarcity of water existing during the latter part of the season.

District No. 35—Consists of all lands irrigated by ditches taking water from the Trinchera creek and its tributaries. No referee has ever been appointed to adjudicate the rights of water consumers in this district, consequently no decrees have been issued and no water commissioner has been appointed, but considerable complaint was made during the past season in regard to the manner in which the water in this district was used and in some instances wasted. I would suggest that a commissioner be appointed for this district, as I think it possible for the superintendent of irrigation to formulate a set of temporary decrees to govern in this matter until such a time as a referee can be appointed and decrees of the court be regularly issued.

I was called out on the 28th day of March, 1893, and was employed 182 days. Some of the time was devoted to office work, but by far the greater time was spent in the field work. From my predecessor in office I received certified copies of the decrees of priority in the various water districts, which I placed in the hands of the different commissioners and gave them instructions relative to their use, and assumed general control over the different water commissioners, superintending the putting in of headgates, the removal of unnecessary dams from the smaller streams, etc.

I rendered about twenty written opinions touching upon the laws of irrigation; in fact, much of my time was spent in orally expounding the laws relating to the rights of consumers and the duties of the officials. I caused the arrest and conviction in

a number of cases of the violators of the laws and a change for the better at once took place. The water commissioners send in a general complaint because of the absence of headgates in the smaller streams.

The present law is certainly very defective in regard to the manner of treating those who refuse to supply themselves with proper headgates. I would suggest that a law be enacted giving water commissioners power to shut off the supply of water in any and all ditches until supplied by headgates approved by him, and a severe penalty that could be enforced against the violation of such law.

During the month of 1894 a much greater scarcity of water prevailed than in the former year, but the experience of the previous year had educated and prepared the water commissioners for the discharge of their duties, so that much better service was rendered and more economical use made of water than usual. Many perplexing and intricate questions were propounded, and many demands that were inequitable and contrary to all law were made and necessarily refused.

I rendered a number of written decisions, as well as oral ones, during this year. The last two seasons have fully demonstrated the necessity for storage reservoirs on the larger streams of this water division. This is particularly true in regard to the Rio Grande and Conejos rivers, because they supply water sufficient to fill several immense reservoirs each, during any season. In fact, they run "bank full" during the months of April, May and June of each year. The construction of storage reservoirs is the only solution of the question of water supply in this valley. If the immense quantities of water that run to waste in the spring months could be held and stored in properly constructed reservoirs until needed later in the season, there would be a sufficient amount to irrigate every acre in the valley, and there is scarcely a stream entering the valley but has somewhere along its course a suitable place for the location of a reservoir at a reasonable expense for construction.

The action taken by the state in regard to the Saguache reservoir is a step in the proper direction, and this undertaking should be pushed rapidly until completed and thus demonstrate the feasibility of the reservoir plan as advocated by the residents of this state.

Irrigation in the San Luis valley is greatly supplemented by artesian wells, of which there are about 2,500 in this water division. In some portions of the valley the lands sub-irrigate for a considerable distance from the wells. In some places storage reservoirs are constructed and irrigation by the flooding process is practiced. The real utility of these wells is best demonstrated by their use in some of the larger towns of the valley—notably Monte Vista and Alamosa—in some instances one well supplying several residents with water for house use as well as for irrigating lawns and small gardens. The Alamosa town well, just west of the town limits, is probably the largest one in the valley, giving a flow of about 500 gallons per minute.

P. A. AMISS,
Superintendent Water Division No. 3.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 20, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, JAMES WARNOCK.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
N. Y. C. Pipe Line.....	West Willow creek..	Mar. 3, 1893	Dec. 22, 1892	100.00	..... C. F. McKenney

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 21, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. C. PURSLEY.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
The South Side Arvilla Ditch	Arvilla creek.....	Nov. 9, 1893	May 25, 1889	24.00	..... La Jara Town Co. and J. D. Eskridge
La Hoya Ditch.....	Alamosa creek	Feb. 21, 1894	Oct. 9, 1886	91.96	..... Abigail Marting et al.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 22, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, JOHN C. DALTON.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Enlargement of Stone Ditch	Conejos (Branch) cr.	Aug. 2, 1893	April 15, 1893	21.74	Samuel Nichols
The Jackson Ditch	San Antonio river	May 15, 1894	April 25, 1889	3.27	Samuel Jackson
El Bosque Irrigating Ditch	Conejos river	Jan. 21, 1894	June 13, 1890	12.21	
				4.00	Cruz Chavez

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 22, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Elk Creek Reservoir No. 1.....	Elk creek	Built on stream.	Sept. 9, 1893	July 24, 1893	46,870,560	----- George W. Pierce
Elk Creek Reservoir No. 2.....	Elk creek	Built on stream.	Sept. 9, 1893	July 20, 1893	257,613,840	----- George W. Pierce
Toltec Reservoir	Los Pinos creek.....	Built on stream.	Nov. 9, 1893	June 30, 1893	291,590,640	----- Robert R. Wright
Los Pinos Reservoir.....	Los Pinos creek.....	Built on stream.	Nov. 9, 1893	July 14, 1893	217,887,121	----- Robert R. Wright
Elk Creek Reservoir No. 1.....	Elk creek	Built on stream.	Aug. 7, 1894	July 20, 1893	1,060	----- George W. Pierce
Elk Creek Reservoir No. 2.....	Elk creek	Built on stream.	Aug. 7, 1894	July 20, 1893	5,986	----- George W. Pierce

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 25, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, JOHN KINNEY.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Lone Tree Springs Ditch	Lone Tree reservoir	Jan. 16, 1893	Nov. 9, 1892	8.00	.....Erwin H. Baker
Desert Ditch	{ Rio Arenas or Sand }	Jan. 17, 1893	Nov. 11, 1892	10.00	.....Erwin H. Baker, et al.
Cargo Ditch	{ creek	Mar. 24, 1893	May, 1886	5.40	.....Charles Miller
Voorhes Ex. of Barbary Table Ditch	Spring creek..... Cedar creek.....	Mar. 24, 1893	Aug., 1892	9.30	.....Bertha M. Voorhes et al.

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 25, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Lone Tree Springs Reservoir--	Lone Tree springs --	{ Lone Tree } { Springsditch }	Jan. 16, 1893	Nov. 9, 1892	130,680	-----Erwin E. Baker

Chapter V.

IRRIGATION DIVISION No. 4—SAN JUAN DIVISION.

No report has been received from division No. 4. In district No. 30 of this division, T. P. Sherertz, of Durango, was appointed commissioner August 2, 1894; H. M. Barbour was appointed and bond approved June 4, 1894. Neither has made report to this office. The irrigation in this division is mostly done from small or individual ditches. As a consequence, there is little need of the work of superintendent or commissioner.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 29, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAME OF CLAIMANT
Eastman Ditch.....	Neutra creek.....	Aug. 7, 1893	May 10, 1887	3.00	.....Floyd Eastman
Mesa Ditch.....	Four Mile creek.....	Nov. 13, 1893	May 19, 1891	7.20	.....E. M. Taylor et al.
Mountain Park Ditch.....	{ Quaken Asp Park } creek.....	June 28, 1894	April 1, 1894	1.00	.....Victor C. McGirr
Mountain Park Ditch, Enlargement.	{ Quaken Asp Park } creek.....	June 28, 1894	April 1, 1894	14.00	.....Victor C. McGirr
Villa Grove Ditch.....	Four Mile creek.....	June 28, 1894	May 2, 1894	25.00	.....Victor C. McGirr
Holy Terror Ditch.....	Blanco Rio.....	July 11, 1894	May 6, 1886	10.00	.....George G. White
The Snow Ball Ditch.....	Turkey creek.....	Nov. 28, 1894	Sept. 3, 1894	.....	.....Victor C. McGirr and Joseph Brownfield

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 30, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, T. P. SHERERTZ.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Usher Ditch.....	Florida river.....	Dec. 19, 1892	June 1, 1882	1.33	James Cash
Abling and Cash Ditch.....	Florida river.....	Dec. 19, 1892	June 1, 1878	2.00	M. S. Abling and James Cash
Prescott South Side Ditch.....	Florida river.....	Mar. 6, 1893	May 10, 1881	2.00	Kate S. Seamain
Prescott North Side Ditch.....	Florida river.....	Mar. 6, 1893	Aug. 11, 1883	1.00	Kate S. Seamain
Hood-Conway Extension of Harrison-Patterson Ditch.....	Not stated.....	Mar. 10, 1893	Feb. 27, 1893	5 50	John Conway
McClure & Murray Ditch.....	Florida river.....	May 31, 1893	April 18, 1878	60.00	McClure, Murray et al.
Pioneer Ditch.....	Florida river.....	May 31, 1893	.....	30.00	{ John Conway, T. J. McClure and William Forsyth
Peter Daum Ditch.....	Lake.....	July 28, 1893	June 15, 1891	6.00	Peter Daum
Bob Hogan Ditch.....	Hermosa creek.....	Feb. 28, 1894	June, 1893	.....	William G. Allen
Section Ten Ditch.....	Hermosa creek.....	Feb. 28, 1894	Oct., 1879	.....	William G. Allen
Hermosa County Ditch.....	Hermosa creek.....	Mar. 8, 1894	1875	20.00	T. A. Kerr et al.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 31, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Salt Creek Irrigation Co.'s Canal----	Rio Los Pinos-----	Mar. 26, 1894	Dec. 21, 1893	150.00	----- Salt Creek Irrigation Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 32, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Tres Aguas Ditch.....	McElmo creek.....	Aug. 23, 1893	Mar. 20, 1888	10.00	..... Walter W. Brown et al.
Parker Ditch.....	Yellow Jacket creek	Aug. 23, 1893	Feb. 9, 1893	4.00	..... Albert Parker et al.
Prater Ditch.....	Hovenweep creek...	Aug. 23, 1893	Feb. 1, 1892	4.00	..... W. F. and Albert Prater
Nickle Ditch.....	McElmo creek	Aug. 23, 1893	May 21, 1890	10.00	..... A. P. Bowdish et al.
John Wilson Ditch.....	McElmo creek.....	July 14, 1894	Oct. 10, 1892	4.00	..... John S. Wilson

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 33, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Pioneer Irrigating Ditch.....	La Plata river.....	Dec. 14, 1892	May 17, 1889	6.00	.....John R. Pond et al.
Parrott Ditch.....	La Plata river.....	Dec. 8, 1893	{ July 17, 1889 and en. Oct. 23, 1893 }	20.00	.....Wm. T. Vaile
Rush Reservoir Ditch.....	Lost creek.....	April 6, 1894	June 27, 1886	20.00	.....J. M. Rush et al.
Crystal Springs Ditch.....	Springs	April 12, 1894	.....	1.50	.....Wm. T. Vaile
La Plata Irri. Ditch—supplemental..	La Plata river.....	April 18, 1894	May 21, 1889	200.00	.....Charles M. Williams et al.
The Kemsey Ditch.....	La Plata river.....	June 11, 1894	Nov. 8, 1893	1,700.00	.....Luther B. Kemsey et al.
Ex. & Enlargement of Parrott Ditch	La Plata river.....	Sept. 10, 1894	June 3, 1894	20.00	.....Casper Moss et al.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 34, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, H. M. BARBORER.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Hazard Supply Ditch	{ Rocky Ford lateral }	April 6, 1894	May 2, 1890	5.00	----- J. G. Hazard
Meadow Ditch	{ and waste..... }	April 17, 1894	April 13, 1887	2.00	----- Aaron Ivins Comfort
The Snider Ditch	Mancos river.....	June 11, 1894	May 1, 1892	2.00	----- William M. Snider
	Aztec Spring creek .				

Chapter VI.

IRRIGATION DIVISION No. 5—GRAND RIVER DIVISION.

Grand Junction, Colo., December 21, 1894.

Hon. C. B. Cramer, State Engineer:

Dear Sir—I transmit herewith the reports of water commissioners in division No. 5, so far as received. This division embraces a large territory, including many mountain streams where water is abundant and the area farmed is small. Consequently several districts have no adjudication and no commissioners, and other districts where commissioners have been appointed have but little use for an officer.

In only three districts of this division has there been any serious trouble. In district No. 39 the commissioner had some difficulty in adjusting the difficulties between the farmers of Rifle creek and the Grass Valley canal, which takes water from a point far up the creek over a divide into another valley. The Grass Valley Company are now finishing a large reservoir which will tide them over the low water season. In the Uncompahgre valley the trouble which has been previously reported still exists by reason of there being no adjudication of rights in district No. 68, which includes all of the upper valley. No control of the waters of this district is obtained, much to the injury of water district No. 41, next below on the same stream. It would be to the interests of the consumers of both districts if adjudication were made in district No. 68 immediately, for new ditches are being built and improvements

made which may result in a considerable loss whenever the proper regulations are made.

In district No. 41 over forty-five different ditches are taken from the river, when three or four canals with the aid of a few laterals would deliver the water to all the lands now under ditch. The present method of delivering water through so many ditches, when a few would do, is an extravagant and expensive one. I believe if some consolidation as indicated above were made and more economy practiced in the use of water, there would be enough for all the lands in this fine valley.

Such a consolidation could hardly be accomplished without some legislative enactment. Perhaps a district law, patterned after the Wright law of California, could be made to apply in this case and other districts similarly situated.

A. J. McCUNE,
Superintendent of Irrigation Division No. 5.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 28, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Chavers & Sprecher Ditch No. 1.....	Flint creek.....	Feb. 15, 1893	Spring, 1887	2.00	..... L. J. Morrison
Chavers & Sprecher Ditch No. 2.....	Flint creek.....	Feb. 15, 1893	Spring, 1888	2.00	..... L. J. Morrison
J. C. Brown Ditch.....	No Name creek.....	May 15, 1894	April 1, 1885	2.45	..... J. C. Brown
Purrier Irrigating Ditch.....	Tomecha creek.....	Oct. 4, 1894	Sept. 10, 1894	4.70	..... Henry Purrier
The Little Emma Ditch.....	Leopard creek.....	Oct. 12, 1894	July 19, 1894	5.87	..... Fred. B. Williams

STATEMENT CONCERNING DITCHES.

IN WATER DISTRICT NO. 36, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Smith's Ditch	{ Middle and North } { Forks of Deep } { creek	Mar. 16, 1893	Oct. 26, 1892	Not given	..... Frank and James T. Smith
The Collins Ditch	{ Tributaries of } { Spruce creek	Nov. 14, 1893	Sept. 19, 1893	10.00	..... Jessie F. McDonald
The Doubtless Ditch	Gold Run creek	Nov. 25, 1894	Oct. 1, 1894	1.87	..... Doubtless Mining Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 37, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, H. E. CHATFIELD.

NAME OF DITCH OR CANAL,	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Keeting Spring Ditch.....	Spring.....	June 1, 1893	Sept. 20, 1886	.90	Thomas McNulty
Cheasty & Thompson Ditch.....	Lime creek.....	Aug. 23, 1893	Aug. 19, 1893	.25	Goeffrey Cheasty and Wm. H. Thompson
Myers' Enl'gem't of Needham Ditch.....	Cattle creek.....	Dec. 12, 1893	June 5, 1893	3.00 } T'tl, 11.00 }	Walker B. Myers
The Maylin Ditch.....	Taylor creek.....	Dec. 27, 1893	Feb. 10, 1888	3.63	Owen Maylin
Castle Ditch.....	Seven Castle creek..	Dec. 27, 1893	May 4, 1885	12.5	Owen Maylin
Downey Ditch No. 1.....	Dry creek.....	May 1, 1894	April 20, 1887	3.00	Nelson R. Downey
Luchsenger Ditch.....	Frenchman creek.....	May 1, 1894	April 28, 1890	4.00	Otmer Luchsenger
The Shehi Ditch.....	Taylor creek, E. B.....	June 11, 1894	May 10, 1894	2.00	Fred A. Shehi
Langton Ditch.....	Eagle river.....	July 13, 1894	May 2, 1892	5.00	John Langton
Luchsenger Ditch.....	Luchsenger creek.....	Aug. 14, 1894	Aug. 15, 1881	2.00	Jacob Luchsenger
Dixon Ditch.....	Grouse creek.....	Sept. 10, 1894	Aug. 16, 1894	3.00	Lillian Dixon

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 58, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, J. N. WHITNEY.

NAME OF DITCH OR CANAL,	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANT'S
Lafayette Cox Ditch (1) -----	{ Fisher's Branch of } Cattle creek -----	Dec. 3, 1892	Aug. 10, 1883	3.00	----- Lafayette Cox
Pierson Ditch -----	Willow creek -----	Dec. 3, 1892	May 15, 1890	11.298	----- Frank A. Pierson
Kelly Ditch -----	Vance spring -----	Dec. 5, 1892	April 20, 1885	3.00	----- Newton Lautz
Orford Ditch No. 1 -----	Roaring Fork river -----	Dec. 7, 1892	April 15, 1882	2.00	----- Edward T. Taylor
Orford Ditch No. 2 -----	Roaring Fork river -----	Dec. 7, 1892	April 15, 1882	5.00	----- Edward T. Taylor
The Gift Ditch No. 1 -----	Springs -----	Dec. 7, 1892	Dec. 15, 1888	1.00	----- Monroe E. Gift
The Gift Ditch No. 2 -----	Springs -----	Dec. 7, 1892	Dec. 15, 1888	1.00	----- Monroe E. Gift
The Gift Ditch No. 3 -----	Springs -----	Dec. 7, 1892	Dec. 15, 1888	1.00	----- Monroe E. Gift
The Gift Ditch No. 4 -----	Springs -----	Dec. 7, 1892	Dec. 15, 1888	1.00	----- Monroe E. Gift
Brown & Monroe Ditch -----	No Name creek -----	Jan. 18, 1893	Dec. 18, 1887	1.10	----- J. C. Brown and E. B. Monroe
Nesbitt Ditch -----	Carbonate creek -----	Jan. 27, 1893	Jan. 23, 1893	15.00	----- Elmer E. Nesbitt
The Fuller Ditch -----	Fuller's creek -----	Feb. 2, 1893	May 2, 1887	3.00	----- E. W. Fuller
Herrick Ditch -----	Morrison creek -----	Feb. 10, 1893	Oct. 1, 1890	20.00	----- E. A. Herrick
Red Butte Ditch -----	Castle creek -----	April 18, 1893	Jan. 18, 1893	1.80	----- J. H. Devereux
Case Ditch -----	Deer creek -----	April 27, 1893	April 25, 1893	4.93	----- Trueman Case

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Ellithorp Ditch	So. Fork of Brush crk	May 27, 1893	May 23, 1893	4.69	C. H. Ellithorp
Clark's High Line Ditch	Mesa creek	June 12, 1893	May 20, 1893	4.00	Wallace Clark
Stapleton Ditch No. 1	Owl creek	June 29, 1893	June 12, 1881	3.00	Timothy C. Stapleton
Stapleton Ditch No. 2	Owl creek	June 29, 1893	June 16, 1883	.70	Timothy C. Stapleton
Stapleton Ditch No. 3	Owl creek	June 29, 1893	.....	.30	Timothy C. Stapleton
Bennett Ditch	{ Prince or Antler's } creek	July 1, 1893	May 1, 1883	2.50	Richard Swan
Thomas Ditch No. 2	Thomas creek	July 1, 1893	April 10, 1884	2.00	George L. Thomas
Kester & Cramer Ditch, Enlargem't	Roaring Fork	Sept. 2, 1893	Sept. 2, 1893	15.705	Samuel Cramer
Eureka Ditch	Ruedi creek	Oct. 6, 1893	June 21, 1891	8.25	J. T. Hough
Nesbitt Ditch—amended filing to No. 128	Carbonate creek	Nov. 10, 1893	Jan. 23, 1893	15.00	W. W. Wood
McNulty Ditch No. 1	Coulter creek	April 6, 1894	May 28, 1888	.80	Patrick McNulty
McNulty Ditch No. 2	Coulter creek	April 6, 1894	May 28, 1888	.50	Patrick McNulty
The East Mesa Ditch	Rock creek	Nov. 7, 1894	Aug. 10, 1894	22.10	Mary J. Francis et al.

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 38, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Nesbitt Reservoir	Carbonate creek ----	Nesbitt ditch ...	Jan. 27, 1893	Jan. 23, 1893	1,000,000	..... Elmer E. Nesbitt

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 39, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, D. F. WEBSTER.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Enlargement of H. C. Russey Ditch.	Parachute creek	Jan. 11, 1893	Jan. 28, 1891	22.16	Josephine Rupp
Perry Waste Water Ditch.	A gulch	Jan. 14, 1893	May 15, 1892	2.00	William O. Perry
The Acklin Waste Water Ditch.	Waste waters	Feb. 20, 1893	Feb. 16, 1893	3.00	John C. Acklin
Con Creek Ditch.	Con creek	Feb. 25, 1893	Jan. 1, 1893	3.00	George S. Snow
Tauney Ditch	Spring creek	Mar. 20, 1893	Mar. 16, 1893	100.00	William H. Tanney
Tauney Ditch	Spring creek	Mar. 31, 1893	Mar. 10, 1893	40.00	William H. Tanney
Tanney Ditch No. 2.	Spring creek	Mar. 31, 1893	Mar. 16, 1893	100.00	William H. Tanney
Hubbard Ditch.	{ Thirty-three Mile } creek	April 26, 1893	April 1, 1893	-----	George R. Hubbard
Roan Creek Ditch, De Beque En.	Roan creek	May 1, 1893	April 28, 1893	-----	W. A. E. de Beque
Spring Valley Ditch.	Rowley gulch	June 27, 1893	May 10, 1890	3.00	Albert and C. I. Starkey
Cooley No. 2 Ditch.	Baldy creek	June 29, 1893	July 17, 1890	1.00	Orson W. Cooley
Cooley No. 3 Ditch.	Baldy creek	June 29, 1893	Mar. 25, 1890	1.00	Orson W. Cooley
Hallett Ditch.	Grand river	July 28, 1893	Dec. 1, 1891	80.00	Grand River D. & R. Co. and R. O. & I. Co.
Ext. & second En. of Hanze Ditch.	{ Rifle creek, middle } fork	April 6, 1894	April 14, 1892	{ 1.00 1.50 }	Emma E. Ward et al.
Yule & Cooley Ditch.	West Garfield creek.	April 26, 1894	Dec. 25, 1893	6.00	Orson W. Cooley and G. Yule

The Helm Waste Water Ditch.....	Waste	May 22, 1894	May 9, 1894	4.00	.....J. M. Helm
The Mason-Wagner Ditch.....	Elk creek, east fork	May 31, 1894	Dec. 1, 1889	2.75	.....Thomas L. Mason
Spruce Gulch Ditch.....	Spruce Gulch creek.....	June 29, 1894	Nov. 9, 1893	1.40	.....John W. Wells
Churchfield Waste Water Ditch.....	Waste	July 13, 1894	Sept. 25, 1893	5.00	.....Peter Churchfield
Crann Waste Water Ditch.....	Waste	July 13, 1894	June 6, 1894	2.00	.....Wm. Crann
G. H. Wilkinson Spring Ditch.....	.....	Aug. 28, 1894	May 8, 1889	1.66	.....Wm. H. Wilkinson
Baxter Ditch No. 1.....	Canon creek.....	Oct. 12, 1894	May 1, 1886	.....	.....J. W. Baxter
Baxter Ditch No. 2.....	Canon creek.....	Oct. 12, 1894	April 1, 1893	1.60	.....J. W. Baxter
Baxter Ditch No. 3.....	Canon creek.....	Oct. 12, 1894	June, 1886	1.60	.....J. W. Baxter
Contratt Ditch.....	Gulch	Oct. 12, 1894	Oct. 9, 1894	1.02	.....Gion Contratt
The No. 3 Reservoir Ditch En.....	Roan creek.....	Nov. 19, 1894	Oct. 30, 1894 }	Increased capacity 2.80	.....J. C. Emerson and J. W. Stout

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 39, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The Malone Reservoir ----- Clarkson & Byrne Reservoir...	Big Salt Wash lakes Porcupine creek ----	Built on lakes... -----	Aug. 24, 1893 Sept. 25, 1893	July 25, 1893 Sept. 11, 1893	20,000,000 3,600,000	----- Cornelius Malone { Geo. E. Clarkson and W. F. Byrne

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, JOHN J. SMITH.

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NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Williams Ditch No. 1	Gulch	Dec. 9, 1892	April 1, 1891	2.00	Lilburn L. Williams
Williams Ditch No. 2	Quakenbush creek	Dec. 9, 1892	April 1, 1891	2.00	Lilburn L. Williams
Williams Ditch No. 3	Gulch	Dec. 9, 1892	April 1, 1891	2.00	Lilburn L. Williams
Tropic Ditch	{ North Fork Guinn- son river }	Dec. 29, 1892	Oct. 1, 1891	37 20	J. D. Blanchard et al.
The Don Quixote Ditch	Adams' gulch	Jan. 6, 1893		6.00	William Grant
Olson Ditch	Waste and seepage	Jan. 9, 1893	Mar. 12, 1889		Peter Olson
Nydolf Ditch	Waste and seepage	Jan. 12, 1893		2.00	
North Fork Canal	North Fork	Feb. 8, 1893	Jan. 8, 1893	454.00	The North Fork Canal Co.
Oberfell & Baldwin Ditch	Dead Man's gulch	Mar. 1 1893	April 1, 1888	10.00	John Oberfell and D. S. Baldwin
Alten Ditch	Seepage and waste	Mar. 24, 1893	Nov. 8, 1892	50.00	S. J. Alten
Crawford Ditch		Mar. 24, 1893			Olof Olson
Coleman Ditch	Seepage and waste	April 10, 1893	April 4, 1893	3.00	Lawrence S. Coleman
Atkins Ditch, E. B.	Little Jordan creek	April 11, 1893	Dec. 20, 1892	15.00	Frank K. Atkins
Alkins Ditch, W. B.	Little Jordan creek			15.00	Frank K. Atkins
Foster & Preston Ditch	Muddy creek	April 25, 1893		6.00	William M. Stewart, Foster & Preston

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Culter Pump, Pipe Line and Ditch	Little Dry creek	April 25, 1893	-----	5.00	Richard A. Culter
McNeil Ditch	Alfalfa draw	May 13, 1893	May 20, 1885	5.00	Charles H. McNeil
Anderson Ditch	Seepage and waste	June 1, 1893	May, 1893	4.70	S. H. Anderson
Rocket Ditch	-----	June 14, 1893	April 30, 1887	6.00	John R. Smith et al.
Et Cetera Lateral Ditch	{ Rustler ditch, waste and s'page }	June 22, 1893	Mar. 25, 1893	25.25	Luke McLean et al.
Ward Ditch	Ward gulch	July 3, 1893	June 1, 1893	4.00	Lewis P. Ward
Lost Trail Ditch	Lost Trail creek	July 17, 1893	April 25, 1893	2.01	Henry W. Anderson
Edwards & King Ditch	Roatcap creek	July 19, 1893	-----	5.50	J. M. Edwards and J. J. King
Twin Ditch	Waste and seepage	Aug. 28, 1893	June 18, 1890	10.00	Beng. Olson
Aqueous Ditch	{ Waste & s'page & nat'l waste water }	Sept. 6, 1893	Aug. 15, 1893	3.00	P. J. Billstrom
Lingren Ditch	{ Kohler gulch and drainage }	Nov. 24, 1893	Nov. 16, 1873	8.00	John Lingren
Paradise Ditch	{ Dead Man's gulch and Milk creek }	Dec. 11, 1893	1887	24.00	J. A. Curtis et al.
Walbert Ditch	{ Drainage and Gar- nett ditch }	Jan. 8, 1894	1883	1.00	H. H. Walbert
Transit Ditch	Waste and seepage	Jan. 27, 1894	Jan. 24, 1894	3.00	Chas. Ellington
R. R. Ditch	Waste and seepage	Jan. 29, 1894	May, 1891	2.00	R. R. Thomas

James H. Short Ditch.....	Feb. 8, 1894	Feb. 3, 1894	2.50	James H. Short
Coffey Ditch.....	Mar. 3, 1894	April 10, 1891	-----	Robert J. Coffey
Field's Ditch.....	Mar. 22, 1894	Aug. 24, 1893	2.00	Charles A. Field
The Bandana Ditch.....	April 5, 1894	Mar. 18, 1892	4.00	Robert R. Thomas and Harry A. Cobbett
The Beslin Ditch.....	April 5, 1894	-----	1.00	F. P. Berlin
Mays' Ditches, Nos. 1 and 2.....	April 5, 1894	April 18, 1892	2.00	G. W. Mays
The Utility Ditch.....	April 16, 1894	-----	2.00	Minon T. Tucker
The Jackson Ditch.....	April 18, 1894	-----	2.00	Wm. T. Jackson
The Thistle Ditch.....	April 23, 1894	Feb. 1, 1894	1.00	Morrison L. Thistle
The Caswell Ditch.....	April 30, 1894	-----	3.00	Wm. Caswell
Dixon Ditch.....	May 24, 1894	-----	2.00	Herbert Dixon
The Usufruct Ditch.....	May 26, 1894	-----	8.00	S. P. Gutshell
Colby Ditch No. 1.....	June 20, 1894	-----	1.00	M. M. Colby
Colby Ditch No. 2.....	June 20, 1894	-----	1.00	M. M. Colby
Cow Creek Ditch.....	July 13, 1894	April 15, 1883	8.00	John G. A. Simson et al.
Overland Ditch.....	July 30, 1894	-----	100.00	Wm. F. Edward et al.
Inter-Ocean Ditch.....	Sept. 10, 1894	May 23, 1886	16.66	Theodore Roeber et al.
Lava Ditch.....	Oct. 1, 1894	May 15, 1894	3.00	D. S. Baldwin
Knowles Ditch.....	Oct. 24, 1894	Oct. 18, 1894	1.00	Martha Knowles
The Stewart Ditch.....	Nov. 14, 1894	Aug. 11, 1894	67.95	Stewart Ditch Co., Geo. Stewart, V.-Pres.

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANT'S
Fountain Reservoir.....	Springs.....	-----	Mar. 1, 1893	Nov. 28, 1892	7,666,580	R. C. Hutchinson & J. T. Cole
Crawford Reservoir.....	-----	Crawford ditch..	Mar. 24, 1893	June 9, 1892	700,000	Lawrence S. Coleman
Crater Reservoir.....	Melting snow & rain	-----	Aug. 24, 1893	July 15, 1893	3,920,400	C. R. Miller et al.
Gray Reservoir.....	Melting snow & rain	-----	Aug. 24, 1893	July 16, 1893	1,089,000	C. H. Gray
Twin Reservoir A.....	Waste and seepage..	Twin ditch.....	Aug. 28, 1893	June 18, 1890	3,558,360	Beng. Olson
Twin Reservoir B.....	Waste and seepage..	Twin ditch.....	Aug. 28, 1893	June 18, 1890	3,310,560	Beng. Olson
Ellington & Cook Reservoir...	Drainage.....	-----	Jan. 8, 1894	Sept. 14, 1893	1,446,000	Ellington & Cook
Wier Reservoir.....	Drainage.....	{ Built on br'nch of creek..... }	Jan. 8, 1894	Oct. 18, 1893	23,522,400	J. F. Wier
Pope & Alderson Reservoir.....	Leroux creek.....	Built on stream..	April 26, 1894	Sept. 14, 1893	2,500,000	{ Francis S. Pope and Samuel A. Alderson
Overland Res. Nos. 1 and 2....	Muddy creek.....	Overland ditch..	July 30, 1894	-----	192,051,500	Wm. F. Duke et al.
Upper Twin Lake Reservoir...	Surface creek.....	-----	Aug. 22, 1894	May 23, 1894	7,400,000	Mason H. Colby and C. Mott
Inter-Ocean Reservoir No. 1....	Gulch.....	Inter-Ocean ditch	Sept. 10, 1894	May, 1886	5 223,000	Theodore Roeber et al.
Inter-Ocean Reservoir No. 2....	Gulch.....	Inter-Ocean ditch	Sept. 10, 1894	May, 1886	2,923,000	Theodore Roeber et al.
Rogers & Harpst Res. No. 1....	Leroux creek.....	Built on stream..	Oct. 24, 1894	Sept. 17, 1894	7,584,000	Calvin Rogers et al.
Rogers & Harpst Res. No. 2....	Leroux creek.....	Built on stream..	Oct. 24, 1894	Sept. 17, 1894	2,720,000	Calvin Rogers et al.

Leon Park Reservoir.....	Drainage.....	Built on stream -	Oct. 24, 1894	-----	-----	Emet Scott
Harry A. Ainsworth Reservoir	Leroux creek	-----	Oct. 13, 1894	-----	9,513,504	H. A. Ainsworth
The Battlement Mesa Ditch } and Res. Co.'s Res. 1, 2 and 3 }	Drainage	Built on lakes...	Nov. 30, 1894	Sept. 15, 1894	-----	Battlement Mesa D. & R. Co.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 41, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—S. A. ENGLEMAN AND A. W. HOVY.

NAME OF DITCH OR CANAL,	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAME OF CLAIMANT
Subterranean Ditch Feeders Nos. 1 & 2	{ Waste, seepage & } { springs ----- }	Dec. 14, 1892	Aug. 15, 1892	-----	Geo. Ash and D. P. Cook
The Midland Ditch Extension	Midland ditch	Dec. 27, 1892	May 10, 1889	-----	The Midland Ditch and Irrigation Co.
Muddy Ditch	Uncompahgre river.	Jan. 25, 1893	June 1, 1891	10.00	Thomas W. Knowles
Henry E. Eadsley Ditch	Spring creek	Mar. 25, 1893	Jan. 6, 1893	6.00	Henry E. Eadsley
Ouray Ditch	Uncompahgre river.	Dec. 20, 1893	Oct. 26, 1893	20.00	Ouray Ditch Co.
Jim Wilson Garden Ditch	Uncompahgre river.	Feb. 13, 1894	June 5, 1882	4.26	Samuel V. Topless, William Arndt et al.
Arroyo Grand Ditch and Feeders 1, 2, 3 and 4	-----	April 13, 1894	Nov. 20, 1893	100.00	J. F. Krebs
Robert Sampson Ditch	Happy Canon creek.	April 18, 1894	April, 1886	2.00	Robert Sampson
Warren Snoddy Ditch	Seepage and waste	Sept. 12, 1894	Mar. 15, 1892	2.00	Warren Snoddy
E. L. Hyatt's Ditch No. 1	Dry creek	Oct. 1, 1894	April, 1894	1.00	E. L. Hyatt
E. L. Hyatt's Ditch No. 2	Coal creek	Oct. 1, 1894	April, 1894	1.00	E. L. Hyatt

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 41, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
The Gutshall Res. No. 1 -----	Uncompahgre river.	{ Rustler ditch } { lateral ----- }	April 16, 1894	Mar. 25, 1894	2,289,850	----- S. P. Gutshall
The Gutshall Res. No. 2 -----	Uncompahgre river.	{ Rustler ditch } { lateral ----- }	April 16, 1894	Mar. 25, 1894	2,567,415	----- S. P. Gutshall

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 42, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, FRED W. HALBORNE.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
The Alta Ditch.....	Grand river.....	Dec. 12, 1892	May 25, 1892	14.40	..... The Alta Land and Water Co.
Sherard & Hughes Ditch.....	East creek.....	Jan. 6, 1893	Dec. 9, 1892	11.40	..... P. H. Sherard and George H. Hughes
Fleck Ditch.....	White Water creek..	Jan. 16, 1893	Oct. 1, 1892	10.00	..... Edward L. Fleck
The Ponsford Ditch.....	Indian creek.....	Feb. 3, 1893	Dec. 22, 1892	75.00	..... William J. Ponsford
The White Water Ditch.....	White Water creek..	Feb. 28, 1893	July 17, 1892	25.00	..... John O. DeGroot and Addison J. McCune
Crawford Irrigating Ditch, Enlargement.....	Rapid creek.....	Mar. 21, 1893	Mar. 14, 1893	3.00	..... Dennis C. Hawthorne
Right Handy Ditch.....	Little Salt wash.....	Mar. 28, 1893	Mar. 20, 1893	3.00	..... Samuel G. McMullen
Coal Creek Ditch.....	Coal creek.....	April 20, 1893	Mar. 6, 1890	4.00	..... George C. Stanley
Cook Irrigating Ditch, Enlargement No. 2.....	Kimball creek.....	April 24, 1893	April 4, 1889	11.50	..... J. W. Mallengly
Robert Dale Leader.....	White Water creek..	May 4, 1893	April 17, 1893	40.00	..... George A. Bird
Dudley Ditch.....	{ Waste, se'page and } rain.....	May 11, 1893	Aug. 1, 1892	3.00	..... Nancy M. Dudley
Plateau Creek Ditch.....	Plateau creek.....	May 22, 1893	May 8, 1893	136.00	{ A. Struthers, George Smith and C. W. Baldwin }
Brownfield Ditch.....	Rapid creek.....	May 27, 1893	Jan. 1, 1893	3.00	..... J. C. Brownfield
Coon Creek Enlargement.....	Coon creek.....	June 14, 1893	May 15, 1893	1.00	..... J. W. Roberts
Reservoir Enlargement Creek.....	Roan creek.....	June 14, 1893	June 1, 1893	2.00	..... Bryson P. Blair and Mrs. J. C. McDonnell

James F. Duffy Irrigation Ditch	Cottonwood creek	June 15, 1893	Mar. 5, 1889	6.00	James F. Duffy and John Kruh
W. & L. Ditch	Grand ditch	June 20, 1893	May 3, 1892	15.00	Charles M. White et al.
McGeoch Ditch	Waste and seepage	June 24, 1893	June 1, 1892	131.00	C. A. Stewart et al.
Whorton Creek Ditch	Whorton creek	July 5, 1893	May 18, 1892	3.00	C. F. Shropshire et al.
Kinney Ditch	Deacon gulch	Aug. 16, 1893	May 12, 1893	2.60	William M. Kinney
Smith & Struthers Ditch	Plateau creek	Aug. 24, 1893	Aug. 7, 1893	50.00	George Smith and Alex. Struthers
The Vega Ditch	Plateau creek	Sept. 12, 1893	May 9, 1889	6.00	J. S. Stapleton and Clarence C. J. Nichols
Spring Ditch	Mesa creek ditch	Sept. 12, 1893	July 24, 1893	3.00	Chas. T. Hissey and Patrick Dalton
J. S. Shotwell Enlargement Ditch	Cottonwood creek	Oct. 9, 1893	May 3, 1893	2.88	John Krich
Kittie Cook Ditch	Ute Canon creek	Nov. 22, 1893	June 13, 1893	3.00	Kittie E. Cook
Stubbs Ditch	Nicholson gulch	Nov. 23, 1893	Oct. 13, 1893	2.72	S. M. Stubbs
Stubbs Enlargement, Park View } and Pioneer of Plateau }	Cottonwood creek	Nov. 23, 1893	Oct. 28, 1893	14.76	S. M. Stubbs
The Pitts Ditch	Deacon Mason gulch	Nov. 28, 1893	Nov. 4, 1893	2.40	O. C. Pitts
Isaac Harvey Ditch	Plateau creek	Jan. 17, 1894	Nov. 1, 1893	3.00	Isaac Harvey
The Cooper Ditch	Grand river	Jan. 20, 1894	Jan. 8, 1894	42.00	C. A. Cooper
Gammage Ditch	Kauna creek	Jan. 29, 1894	Nov. 1, 1892	2.72	M. Gammage
The Storage Ditch	Salt wash	Feb. 19, 1894	Dec. 6, 1893		George J. D. Williams
Palmer Ditch	Devil's Gulch wash	Feb. 21, 1894	June 1, 1894	7.50	J. F. Palmer
Poverty Flat Irrigation Ditch	Grand river	Mar. 7, 1894	Oct. 1, 1892	30.00	Norman J. Krusen
First Enlargement, R. and A. G. } Anderson Ditch }	Cache creek	Mar. 27, 1894	{ July 15, 1887 Mar. 20, 1894 }	10.00 2.00	H. E. Dillman
Enlargement No. 3, Roan Creek } No. 2 Ditch }	Roan creek	April 2, 1894	May 15, 1893	1.25	James Lightfoot

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
No. 1 Enlargement, Selly Irrigating Ditch	Coats creek	April 9, 1894	April 3, 1894	{ 2.85 } { 5.76 }	B. W. Moore
Mt. Lincoln Ditch	Grand river	April 27, 1894	April 20, 1894	500.00	Mt. Lincoln Land and Water Co.
Smith & Struthers Ditch	Rapid creek	April 28, 1894	Nov. 1, 1893	10.00	George Smith and Alexander Struthers
Smith & Struthers Ditch Enlargement	Rapid creek	April 28, 1894	April 26, 1894	10.00	Alta Land and Water Co.
Kinney No. 2 Ditch, Enlargement	Deacon Gulch creek	April 30, 1894	April 26, 1894	{ 2.70 } { 1.40 }	S. W. Jones
Smith & Struthers Power Canal	Plateau creek	May 18, 1894	May 17, 1894	200.00	George Smith and Alexander Struthers
Spruce Creek Ditch	Spruce creek	May 24, 1894	April 27, 1894	13.00	John W. Stevens
Capps' Ditch	Mill creek	July 10, 1894	May 20, 1894	1.50	Rufus S. Capps
Holmes Enlarged Ditch	Cache creek	July 13, 1894	Mar. 26, 1894	4.00	Daniel Riley
The Bear Creek Ditch	Bear creek	July 21, 1894	June 19, 1894	1.00	J. M. Campbell
The Barrel Ditch	Barrel creek	July 21, 1894	July 13, 1894	2.56	Hans C. Olson
Conner Ditch	Mill and East creeks	Aug. 3, 1894	July 2, 1894	3.00	John R. Conner
The Parker Ditch	Cottonwood creek	Aug. 14, 1894	May 1, 1894	6.00	W. S. James and G. S. Ferguson
The Skinner Ditch	East creek	Aug. 14, 1894	Aug. 11, 1894	2.64	Edward Skinner
The McKinney Ditch	{ Waste, seepage & } { spring }	Aug. 27, 1894	April 15, 1893	3.00	Charles McKinney
Wightman Enlargement Harding & Lemer Ditch	Cache creek	Aug. 28, 1894	{ Oct. 3, 1893 } { Nov. 20, 1894 }	2.56 5.00	Geo. W. Wightman
Enlargement Oakland Ditch	Lemmer creek	Sept. 10, 1894	June 9, 1894	1.82	John Gunderson

Sinbad Seepage Ditch	Clear creek	Oct. 12, 1894	Sept. 1, 1894	3.00	..... Philander Maxwell
Enlargem't Atkinson & Glen Ditches	Plateau creek	Oct. 24, 1894	{ Apr. 10, 1892 Sep. 14, 1892 }	7.30 1.53	..... Zach. Higgins
The Mouroe Ditch	Mesa creek	Oct. 24 1894	Oct. 3, 1894	1.30	..... Albert Monroe
The Short Line Ditch	Mesa creek	Oct. 24, 1894	Oct. 3, 1894	1.30	..... Charles Atwell
The Fruita Canal	{ Waste and Grand Valley canal	Nov. 28, 1894	Sept. 1, 1894	75.00	..... Keiffer Bros.

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 42, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Shropshire Reservoir.....	{ Kannah creek ex- tension ditch..... }	Built on stream..	Jan. 10, 1893	Sept. 22, 1892	576,300	----- R. W. Shropshire
Ponsford Reservoir.....	Indian creek.....	Ponsford ditch..	Feb. 3, 1893	Dec. 22, 1892	-----	----- Wm. J. Ponsford
Farmer Reservoir.....	{ Kannah creek and drainage..... }	Feeder to same..	Feb. 28, 1893	Sept. 10, 1892	9,000,000	{ John C. DeGroot and Addison J. McCune
Whitewater Reservoir No. 1.....	{ Whitewater creek and drainage..... }	Built on stream..	Feb. 28, 1893	July 17, 1892	48,746,000	{ John C. DeGroot and Addison J. McCune
Whitewater Reservoir No. 2.....	{ Whitewater creek and drainage..... }	Feeder to same..	Feb. 28, 1893	July 17, 1892	59,160,000	{ John C. DeGroot and Addison J. McCune
Robert Dale Reservoir.....	{ Whitewater creek and drainage..... }	Robt. Dale leader	May 4, 1893	April 17, 1893	25,000	----- George A. Bird
Leone Reservoir.....	Leone creek.....	Built on stream..	Oct. 9, 1893	July 31, 1893	130,000,000	----- J. L. Baldridge et al.
Sherard & Hughes Reservoir..	East creek.....	-----	Oct. 17, 1893	Oct. 2, 1893	50,000	{ P. H. Sherard and Geo. H. Hughes
Big Creek Reservoir No. 1.....	Big creek.....	-----	Dec. 26, 1893	Aug. 8, 1893	25,000,000	----- Big Creek Reservoir Co.
Big Creek Reservoir No. 2.....	Big creek.....	-----	Dec. 26, 1893	Aug. 8, 1893	12,400,000	----- Big Creek Reservoir Co.
Big Creek Reservoir No. 3.....	Big creek.....	-----	Feb. 21, 1894	Sept. 24, 1893	65,000,000	----- William L. Rice et al.
Big Creek Reservoir No. 4.....	Big creek.....	-----	Feb. 21, 1894	Sept. 24, 1893	25,000,000	----- William L. Rice et al.
Shropshire Reservoir.....	Gunnison river.....	Flume.....	Aug. 13, 1894	Dec. 22, 1892	100,188	----- R. W. Shropshire
Skinner Reservoir No. 1.....	East creek, S. B.....	Built on stream	Aug. 22, 1894	Aug. 11, 1894	1,045,440	----- Edward Skinner

Skinner Reservoir No. 2.....	East creek, S. B.....	Built on stream.	Aug. 22, 1894	Aug. 11, 1894	261,360	.....Edward Skinner
Skinner Reservoir No. 3.....	East creek, S. B.....	Built on stream.	Aug. 22, 1894	Aug. 11, 1894	348,480	.....Edward Skinner
Skinner Reservoir No. 4.....	East creek, S. B.....	Built on stream.	Aug. 22, 1894	Aug. 11, 1894	435,600	.....Edward Skinner
Dyer & McNelly Reservoir 1...	.....	.....	Nov. 1, 1894	Oct. 1, 1892	1,045,440	John Dyer and John McNelly
Dyer & McNelly Reservoir 2...	.....	.....	Nov. 1, 1894	Oct. 1, 1892	130,630	John Dyer and John McNelly
Dyer & McNelly Reservoir 3...	.....	.....	Nov. 1, 1894	Oct. 1, 1892	24,360	John Dyer and John McNelly

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 45, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, PETER CHURCHFIELD.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Sykes Enlargement, Gilmore Ditch	Oasis creek	Dec. 3, 1892	Mar. 16, 1890	1.50	Harman W. Ennem
L. & C. Ditch	Beaver creek	Dec. 21, 1892	May 16, 1892	70.00	Wm. Cram and Peter Lux
Enterprise Ditch	Mamm creek	Jan. 11, 1893	July 1, 1891	4.17	Wm. Cram et al.
Seitz Ditch	Wallace creek	Jan. 11, 1893	May 10, 1892	16.67	J. K. Smythe
Gustafson Ditch	Gulch	Jan. 12, 1893	July 10, 1893	3.00	Alma C. Gustafson
The Lester Talmadge Ditch	Main Divide creek	Feb. 3, 1893	April 15, 1885	120.00	Lester Talmadge
The People's Ditch	Grand river	Feb. 15, 1893	Oct. 6, 1892	50.00	W. H. Tanney et al.
Savin Enlargement, Huntley Ditch	Battlement creek	Mar. 28, 1893	Aug. 2, 1887	2.50	Geo. F. Savin
Plateau Canon Ditch	Plateau creek	May 8, 1893	May 1, 1893	225.00	Alta Land and Water Co.
Plateau High Line Ditch	Plateau creek	May 22, 1893		28.00	E. H. Parkinson et al.
Kinney Ditch No. 2	Deacon Gulch creek	Jan. 3, 1894	Dec. 28, 1893	2.70	Wm. M. Kinney
Grove Creek No. 3 Ditch	Grove creek	Mar. 24, 1894	Sept. 10, 1886	6.00	Christian Lude
Watson Ditch	Alkali creek	April 13, 1894	Mar. 26, 1894	1.00	William J. Watson
Johnson Ditch	East Divide creek	April 21, 1894	April 10, 1893	2.50	Sever Johnson
Basco Ditch	Gulch	June 4, 1894	April 28, 1894	1.00	Henry Basco

The Doby Ditch.....	Battlement creek ---	June 29, 1894	June 29, 1893	5.00	.....	Jaue Doby
Enlargement Cedar Ridge Ditch	-----	June 29, 1894	Sept. 24, 1893	5.00	.....	Jaue Doby
The Joe Taylor Ditch.....	{ South Park Fork }	June 25, 1894	May 7, 1887	3.00	.....	J. C. Taylor
The Walker Ditch	{ Garfield creek }	June 27, 1894	May 10, 1892	3.40	.....	Lonisa E. Walker
The Harris Ditch	Mamm creek.....	Aug. 13, 1894	July 25, 1894	3.00	.....	James E. Harris
Moir Ditch	Willow springs.....	Aug. 13, 1894	May 1, 1894	-----	.....	George Moir
McKee No. 2 Ditch.....	Three Mile creek ---	Aug. 24, 1894	May 20, 1894	1.00	.....	M. H. McKee
Enlargement Shutt Ditch.....	Waste and seepage..	Aug. 28, 1894	May 1, 1894	5.33	.....	C. F. and G. W. Shutt, and Mary E. Rowley
W. A. Skelton Ditch	Battlement creek ---	Sept. 11, 1894	Oct. 15, 1890	-----	.....	William A. Skelton
DeWitt Ditch	Grand river	Sept. 30, 1894	Sept. 4, 1894	2.83	.....	Emma DeWitt
	W. Battlement creek					

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 45, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Kerlee Reservoir.....	{ Streams & Jack's } { Pocket gulch..... }	Kerlee ditches ..	Dec. 3, 1892	Sept. 28, 1892	-----	----- Jessie F. Kerlee
The Lux Reservoir.....	{ Beaver creek, sp'gs. } { and gulch..... }	The L. & C. } ditch feeder.. }	Jan. 11, 1893	June 22, 1892	4,000,000	----- Lula and Peter Lux
Seitz Reservoir.....	Wallace creek	Seitz ditch	Jan. 11, 1893	May 10, 1892	600,000	Jas. A. Seitz and J. R. Smythe
The Doby Reservoir	Springs and snow	Built on stream ..	June 29, 1894	-----	-----	----- Jane Doby
Battlement Reservoir No. 1.....	Battlement creek.....	Built on stream ..	Sept. 12, 1894	June 13, 1894	6,273,140	--- George J. Parmenter et al.
Battlement Reservoir No. 2.....	Battlement creek.....	Built on stream ..	Sept. 12, 1894	June 13, 1894	12,545,280	--- George J. Parmenter et al.
Battlement Reservoir No. 3.....	Battlement creek.....	Built on stream ..	Sept. 12, 1894	June 13, 1894	12,454,400	--- George J. Parmenter et al.
Battlement Reservoir No. 4.....	Battlement creek.....	Built on stream ..	Sept. 12, 1894	June 13, 1894	4,181,760	--- George J. Parmenter et al.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 51, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Hallworth Ditches Nos. 1 and 2	Nine Mile creek	Dec. 13, 1892	Aug., 1884		Anton Hallworth
Sumner Ditch	Willow creek	May 31, 1893	May 31, 1893		J. W. Bowles
Placer Ditch No. 1	Willow creek	Aug. 30, 1893	Aug. 14, 1893	120.00	J. C. Veatch et al.
Fullerton Ditch	Hamilton creek	Sept. 21, 1893	Oct. 21, 1889	5.00	William Fullerton

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 53, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, CHAS. M. MORRIS.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Buttrick Ditch	Watson creek	Dec. 14, 1892	Dec. 3, 1892	4.00	..... Homer Buttrick
Blank Ditch	King creek	Nov. 15, 1893	July 5, 1893	1.00	..... Preston King
Clark Ditch	Egiro cr'k, north frk	May 9, 1894	May 6, 1892	4.00	..... John F. Clark
Morse Ditch	Egiro cr'k, south frk	May 9, 1894	May 6, 1892	3.00	..... John F. Clark
Enlargement and Extension Buf- falo Head Ditch.....	King creek	June 13, 1894	April, 1888	{ 8.00 Orig. } 3.00 }	..... M. Adella King
Brinker Creek Ditch	Brinker creek	July 19, 1894	May 1, 1894	13.00	..... Wm. Boor
Hoag Ditch	Red Dirt creek ..	Sept. 10, 1894	July 24, 1894	10.00	..... Elmer Hoag
George Ditch	Wahler Gulch creek	Nov. 13, 1894	Oct. 23, 1894	2.00	..... R. J. Wilson
Homestead Ditch	Sunny Side creek ..	Nov. 14, 1894	May 29, 1893	2.00	..... W. J. Cock

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 59, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892. TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Fisher Ditch	East river	Dec. 5, 1892	1886	20.00	..... H. L. Fisher
Enlargement Crested Butte Water Supply Ditch	Coal creek	Feb. 6, 1893	Jan. 6, 1892	6.00	..... Henry C. Wright
Clarence Ditch	Carbonate creek	Mar 31, 1893	Mar. 15, 1893	8.40	..... H. R. Woodward
Valentine Ditch	Ohio creek	July 15, 1893	July 7, 1893	6.60	.....
Alfred Ditch	Willow creek	Oct. 31, 1893	Oct. 5, 1891	1.00	..... Cyprian Rouviere
Munch Ditch	Willow creek	Aug. 24, 1893	Aug. 16, 1893	5.50	..... Albert Munch
Dutch Creek Ditch	{ Dutch and Taylor } { gulches	May 23, 1894	April 24, 1894	3.85	..... Robert Ahren
Kubrak Ditch	East river	May 23, 1894	April 25, 1894	3.85	..... Anton Kubrak
Annie Irrigating Ditch	Wilson creek	June 18, 1894	June 11 1894	8.90	..... Anna Maria Bourne
Havell Ditch	Sun creek	Sept. 21, 1894	Sept. 12, 1894	6.70	..... John Havell

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 60, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
R. H. Blake's Ditch.....	San Miguel river.....	Jan. 7, 1893	.....	2.64	..... R. H. Blake
Raibideaux Canal.....	Raibideaux creek.....	May 20, 1893	May 6, 1893	100.00	..... M. H. Payne et al.
Warner Ditch.....	Naturita.....	Aug. 17, 1893	May, 1884	.95	..... E. J. Warner
Hardscrabble Ditch.....	Disappointment cr.....	May 10, 1894	Mar. 6, 1886	.09	..... John W. Westcott
Disappointment Ditch.....	Disappointment cr.....	May 18, 1894	Feb. 1, 1892	.....	..... John W. Westcott et al.
Carr & Waddle Ditch.....	East Fork Deep cr.....	May 26, 1893	Nov. 17, 1893	16.00	..... Jonathan W. Carr and Frank W. Waddle
Hardscrabble Ditch.....	East Fork Deep cr.....	June 4, 1894	May 1, 1892	10.00	..... Jonathan W. Carr and R. S. Painter
Hardscrabble Ditch Enlargement.....	East Fork Deep cr.....	June 28, 1894	April 14, 1894	25.00	..... J. W. Westcott
Little Emma Ditch.....	Leopard creek.....	Oct. 12, 1894	July 19, 1894	5.87	..... Fred D. Williams
Elk Creek Ditch.....	Elk creek.....	Oct. 31, 1894	Sept. 13, 1894	13.45	..... Mark H. Frazier et al.
Canuck Ditch.....	Muddy creek.....	Nov. 28, 1894	June 2, 1894	10.25	..... Fred Foster

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 60, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Telluride Reservoir.....	Comet creek	Built on stream .	May 8, 1893	May, 1893	83,333	...Town Council of Telluride

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 61, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, GEO. H. BLAKE.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Galloway Ditches Nos. 1, 2, 3 and 4--	Dolores river-----	Sept. 11, 1894	Sept. 1, 1893	153.68	----- James P. Galloway

STATEMENT CONCERNING DITCHES.

IN WATER DISTRICT NO. 62, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Carpenter Irrigating Ditch	Cebolla creek	June 6, 1893	April 27, 1893	8.50	.....J. J. Carpenter
Veo Ditch	Cimmarron river	July 29, 1893	Sept. 15, 1883	9.66	.....M. A. Thomas et al.
Dean Ditch	North Beaver creek.	June 27, 1894	June 1, 1890	35.00	.....J. G. Dean

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 63, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Wilkinson Ditch	{ Springs in Stevens' }	Sept. 15, 1893	Aug. 21, 1893	2.00	..... Charles A. Wilkinson
Goshorn Ditch No. 1	Deep creek	May 26, 1894	April 10, 1894	4.00	..... Stevens Land and Cattle Co.
Goshorn Ditch No. 2	Deep creek	May 26, 1894	April 10, 1894	4.00	..... Stevens Land and Cattle Co.
Neathy Ditch No. 2	Geyser creek	May 26, 1894	April 10, 1894	4.00	..... Stevens Land and Cattle Co.
Waggoner Ditch	Springs	July 30, 1894	Aug. 21, 1893	6.00	..... J. Q. Waggoner

Chapter VII.

IRRIGATION DIVISION No. 6—GREEN RIVER DIVISION.

H. E. Turner, superintendent division No. 6, reports only three districts in his division, as follows:

District No. 54—Number of acres that can be irrigated, 3,585; total number irrigated, 2,249 acres. The district is small, and the most of the irrigation is upon hay land.

District No. 57—Number of acres that can be irrigated, 11,928; total number irrigated, 8,216 acres, divided as follows: Alfalfa, 240 acres; other seeded grasses, 2,842 acres; natural grasses, 3,738 acres; all other crops, 1,396 acres.

District No. 58—Total length of ditches, 110 miles; amount that can be irrigated, 26,945 acres; total amount irrigated, 14,216 acres, divided as follows: Seeded grasses, other than alfalfa, 7,471 acres; natural grasses, 5,255 acres; all other crops, 1,500 acres; cost of repairs for the season of 1894, \$2,523.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 43, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, W. H. CLARK.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Marvine Ditch No. 1.....	Marvine creek.....	Dec. 29, 1892	Sept. 20, 1889	10.34	..... C. F. Pease
D. B. Chase Ditch.....	White river.....	Dec. 29, 1892	Mar. 10, 1884	15.204	..... D. B. Chase
Foreman's Ditch.....	White river.....	Jan. 3, 1893	July 31, 1889	8.50	..... C. W. Foreman
Sheridan & Morton Ditch.....	White river.....	Mar. 24, 1893	Jan. 1, 1887	13.70	..... F. F. Sheridan et al.
Highland Cemetery Ditch.....	Slough and springs.	April 26, 1893	April 17, 1893	2.20	..... Highland Cemetery Co.
Johnson Ditch.....	Miller creek.....	May 1, 1893	Sept. 17, 1890	15.07	..... J. M. Johnson
Rio Blanco Co.'s Irrigating Ditch...	Elk & Miller creeks.	Mar. 26, 1894	May 6, 1893	217.35	..... Rio Blanco Irrigating Co.
Independent Ditch.....	White river.....	June 4, 1894	May 30, 1894	3.00	..... John Campbell
Oak Ridge Park Ditch.....	White river.....	July 16, 1894	Aug. 10, 1887	26.00	..... F. E. Watson et al.

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 44, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL,	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANT'S
Emerson Ditch	Springs and rain	June 30, 1893	.....	4.00	..... Thomas Emerson
William A. Morgan Ditch	Yampa river	Dec. 15, 1892	Oct. 15, 1892	10.00	..... William A. Morgan
Milk Creek Ditch No. 1	Milk creek	Dec. 24, 1892	Mar. 16, 1883	5.36	..... John A. Hall & Co.
Pat Sullivan Ditch No. 1	{ So. Fork Williams } { river	Dec. 29, 1892	Mar. 28, 1889	3.20	..... Patrick Sullivan
Pat Sullivan Ditch No. 2	Cedar creek	Dec. 29, 1892	Aug. 29, 1892	3.20	..... Patrick Sullivan
Good Spring Ditch No. 1	Good Springs creek	Mar. 3, 1893	Spring, 1885	1.15	..... John A. Hall & Co.
Good Spring Ditch No. 2	Good Springs creek	Mar. 3, 1893	Spring, 1885	7.63	..... John A. Hall & Co.
John H. Collom Ditch	Good Springs creek	May 15, 1893	Spring, 1883	7.00	..... Joseph Collom
Greenhow Ditch No. 1	Milk creek	June 8, 1893	May 10, 1892	1.75	..... Henry H. Greenhow
Greenhow Ditch No. 2	Milk creek	June 8, 1893	May 10, 1892	1.75	..... Henry H. Greenhow
Lay Ditch	Lay creek	June 14, 1893	May, 1888	6.00	..... A. G. Wallihan
Charles Collom Ditch	Wilson creek	June 17, 1893	May 10, 1887	7.00	..... Charles J. Collom
Moody Ditch No. 2	Watson creek	July 24, 1893	June 15, 1891	5.00	..... Elijah Moody
Big Mesa Ditch	Yampa river	Aug. 14, 1893	Sept. 27, 1888	36.00	..... W. W. Carle et al.
Milk Creek Ditch	Milk creek	Dec. 9, 1893	Oct. 26, 1893	20.00	..... Walter Thomas and William James

STATEMENT CONCERNING DITCHES—Concluded.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Hallett & Torrence Ditch.....	Wilson creek	April 10, 1894	Mar. 1, 1885	8.00	..... C. F. Hulett et al.
Pioneer Ditch.....	Oak creek.....	Oct. 12, 1894	July 6, 1894	3.18	..... Wm. L. Mahoney
Rosedale Ditch.....	Oak creek.....	Oct. 12, 1894	July 7, 1894	3.18	..... Henry N. Myers
Little Oak Ditch.....	Oak creek.....	Oct. 12, 1894	July 5, 1894	2.56	..... James R. Ackeret
Emerson Ditch	Lay creek	Nov. 19, 1894	Nov. 19, 1894	2.40	..... Thomas Emerson

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 44, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Emerson Reservoir	Springs and rain	Emerson ditch ..	June 30, 1893	.....	493,000	..... Thomas Emerson
Lay Reservoir	Lay creek	Lay ditch	June 14, 1893	May, 1888	1,352,000	..... A. G. Wallihan
Emerson Reservoir	Lay creek	Lay ditch	Nov. 19, 1894	Nov. 19, 1894	1,566,940	..... Thomas Emerson

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 54, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Slater Fork Mining Ditch	Slater Fork creek	Jan. 12, 1893	Nov. 27, 1892	25.00	..... The Four Mile Placer Mining Co.
Morgan Slater Ditch	Slater creek	June 23, 1893	June 1, 1885	12.00	..... Wm. T. Morgan
Morgan Irrigating and Water Ditch.	Snake river	June 23, 1893	June 7, 1879	25.00	..... Wm. T. Morgan
Independent Ditch	Willow creek	Feb. 5, 1894	Nov. 18, 1893	14.20	..... C. E. Ayer

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 57, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894—COMMISSIONER, CHAS. R. FISKE.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet per second	NAME OF CLAIMANT
Elk Horn Irrigating Ditch	Little Bear creek.....	Jan. 7, 1893	Sept. 15, 1892	10.00	..... F. W. Pleisenberger
Mesa Irrigating Ditch	Fortification creek..	Mar. 30, 1894	Aug. 4, 1891	30.00	..... Julia L. Rose et al.
Maude S. Ditch	{ Little Cottonwood } creek.....	Jan. 11, 1894	May 12, 1894	9.00	..... C. E. Baker
Clear Spring Ditch.....	Clear Spring branch	Aug. 16, 1894	Mar. 1, 1894	1.00	..... Adolph Belot

STATEMENT CONCERNING DITCHES

IN WATER DISTRICT NO. 58, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE, FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894--H. E. TURNER.

NAME OF DITCH OR CANAL	Stream from which water is taken	Date of filing in the State Engineer's office	Time of commencement of work thereon	Capacity claimed in cubic feet per second	NAMES OF CLAIMANTS
Bonnie & Johnson Enlargm't Ditch	Walton creek	May 18, 1893	Nov. 12, 1892	49.00	A. T. Bonnie and C. W. Johnson
Woolery Ditch	Bear river	Jan. 19, 1893	June 14, 1885	50.00	H. and J. M. Woolery
Patton Ditch	Watson creek	Mar. 17, 1893	July 18, 1892	15.00	W. M. Patton
Reynolds' Supply Ditch	Bruce creek	Mar. 23, 1893	June 15, 1890	6.50	Harvey Woolery
Mesa Ditch	Farnsworth creek	June 14, 1893	Nov. 15, 1892	7.00	James H. Hitchins
Lindsey Ditch	Yampa river	July 3, 1893	April 10, 1889	15.00	T. P. Lindsey et al.
Bijou Ditch	Watson's creek	Sept. 25, 1893	May 20, 1893	2.00	Isaac Bijou
Burgess Ditch, Enlargment	Walton creek	Oct. 19, 1893	July 18, 1892	3.00	Phil A. Burgess and Wm. H. Moore
Hitchins' Ditch, Enl'r't Morin Ditch		Jan. 15, 1894	Sept. 27, 1893	2.01	Wm. Hitchins and Isaac Young
Reader Ditch	Spring creek	April 5, 1894	Oct. 14, 1893	3.00	J. A. H. Reader
Koll Ditch	Trout creek	Oct. 12, 1894	May 4, 1894	4.32	John Koll

STATEMENT CONCERNING RESERVOIRS

IN WATER DISTRICT NO. 58, RELATIVE TO WHICH STATEMENTS HAVE BEEN FILED IN THE STATE ENGINEER'S OFFICE FROM
DECEMBER 1, 1892, TO DECEMBER 1, 1894

NAME OF RESERVOIR	Stream supplying water therefor	Ditch conveying water thereto	Date of filing in the State Engineer's office	Time of com- mencement of work thereon	Capacity claimed in cubic feet	NAMES OF CLAIMANTS
Reynolds' Reservoir	Bruce creek	{ Reynolds' Sup- ply ditch }	Mar. 23, 1893	Oct. 24, 1892	1,558,153	----- Harvey Woolery
Hart Lake Reservoir	Watson creek	-----	Oct. 24, 1894	July 17, 1892	10,528,860	----- Arnold Powell et al.

Chapter VIII.

C. B. Cramer, State Engineer:

Sir—I have the honor herewith to present the following report of the deputy gauger's department for the years 1893 and 1894. During the irrigation seasons I was employed in rating ditches in divisions 1 and 2. The waters of these two divisions are all appropriated, and it becomes a matter of great consequence that each ditch shall be carefully rated, that justice may be done to all. With the exception of a few districts in Division 1, there is a general failure of the different ditch companies to provide suitable measuring flumes. On many of the smaller ditches some form of the weir could be used with more accuracy and greater convenience.

In July, 1894, in company with Mr. Tenney, commissioner of district No. 3, I visited the Laramie river ditch and made measurements to ascertain the amount of water they were turning into Chambers lake at the head of the Cache la Poudre river. A rectangular wier had been placed near the lower end of the ditch, but as there was considerable danger of it washing out, another flume was put in further up the ditch and rated. There is a great variation in the flow of the streams this near the range during the twenty-four hours, but the discharge of the ditch was found to average about eighty-five cubic feet per second. On July 14 a measurement was made of the west branch of the Laramie river above the head of the ditch, and was found to be discharging 148.6 cubic feet per second. Another measurement, on July

19, of the main branch of the Laramie river, just above the state line, gave a discharge of 449.6 cubic feet per second.

RIVER GAUGINGS.

It was found at the opening of the season of 1893 that the available funds for keeping up the various gauging stations on the different streams were not sufficient for the purpose. It is to be deeply regretted that such was the case, as it breaks a record that can never be completed; and as water increases in value, it will be essential to have such data that we may know how much water we may depend on from all the principal streams on the Eastern Slope, and many on the Western. It would be wise should the next legislature make a small appropriation to re-establish the more important of these stations, and establish any others they may think necessary. The readings have generally been made twice a day by some person that was handy to the gauging station, and paid from five to ten dollars per month by this department and the United States Geological Survey.

Through the courtesies of Prof. F. H. Newell, of the United States Geological Survey, and Prof. L. G. Carpenter, of the Agricultural College, this department has been furnished with the tables of discharges of the Arkansas, Rio Grande and the Cache la Poudre rivers, for the years 1893 and 1894.

TABLE SHOWING DAILY MEAN DISCHARGE

IN CUBIC FEET PER SECOND OF TIME OF THE ARKANSAS RIVER, AT CANON CITY, FURNISHED BY THE UNITED STATES
GEOLOGICAL SURVEY FOR
1893.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day
1	480	505	505	800	605	1875	2515	730	690	-----	-----	-----	1
2	580	580	555	605	605	1975	2810	1715	730	-----	-----	-----	2
3	580	455	660	555	555	2080	2315	545	730	-----	-----	580	3
4	555	455	505	660	530	1975	2190	222	810	-----	-----	580	4
5	530	505	505	605	530	2028	1910	200	810	-----	-----	510	5
6	505	505	555	580	480	1975	1715	580	730	-----	-----	580	6
7	530	505	580	605	605	2253	1530	650	650	-----	-----	450	7
8	505	505	605	530	605	2380	1290	900	615	-----	-----	390	8
9	480	505	605	505	770	2890	1235	770	580	-----	-----	390	9
10	505	605	580	555	530	2515	1180	650	580	-----	-----	390	10
11	530	530	530	505	770	2990	1180	580	480	-----	-----	390	11
12	480	505	605	555	530	3210	900	545	480	-----	-----	390	12
13	480	555	530	580	605	2990	945	480	480	-----	-----	390	13
14	530	630	480	505	1100	3070	855	420	450	-----	-----	390	14
15	530	480	555	505	1255	3805	855	390	450	-----	-----	390	15
16	530	530	505	530	1100	4060	1235	450	420	-----	-----	390	16

17	505	555	505	530	1175	4660	855	480	420	-----	-----	390	17
18	505	555	520	555	1975	4750	810	580	420	-----	-----	390	18
19	480	555	505	530	2890	4570	855	650	365	-----	-----	390	19
20	430	530	580	555	3210	4400	810	580	340	-----	-----	450	20
21	480	530	555	530	3050	4400	730	580	340	-----	-----	450	21
22	455	555	555	505	2813	3550	650	580	315	-----	-----	390	22
23	430	555	505	480	2315	3720	510	545	315	-----	-----	390	23
24	505	530	555	505	2080	3050	480	545	315	-----	-----	450	24
25	505	480	530	660	1875	3635	420	510	290	-----	-----	510	25
26	455	580	530	555	1975	3295	450	480	290	-----	-----	450	26
27	480	580	530	630	2080	3210	315	480	290	-----	-----	390	27
28	580	555	505	580	1975	2890	290	480	315	-----	-----	390	28
29	505	-----	530	505	2890	2813	450	480	315	-----	-----	390	29
30	505	-----	555	740	2315	2445	390	510	290	-----	-----	390	30
31	555	-----	885	-----	2080	-----	450	510	-----	-----	-----	390	31
Mean	507	537	555	568	1480	3115	1069	575	477	-----	-----	425	Mean

TABLE SHOWING DAILY MEAN DISCHARGE

IN CUBIC FEET PER SECOND OF TIME OF THE ARKANSAS RIVER, AT CANON CITY, FURNISHED BY THE UNITED STATES
GEOLOGICAL SURVEY FOR
1894.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day
1	450	510	510	390	1080	3380	1290	730	650	390	245	-----	1
2	510	450	580	390	1180	2735	1290	810	580	390	245	-----	2
3	450	390	510	390	1080	2990	1290	730	580	340	245	-----	3
4	580	390	510	450	1080	3210	1530	650	510	340	245	-----	4
5	390	390	450	510	990	3550	2190	810	580	340	290	-----	5
6	450	390	450	510	1080	4400	2190	730	580	340	245	-----	6
7	390	450	510	580	1180	4230	2315	650	580	450	290	-----	7
8	390	450	510	510	1290	4400	1650	580	650	340	245	-----	8
9	390	450	580	510	1410	3550	1530	810	650	340	245	-----	9
10	390	390	650	510	1530	2990	1410	730	730	290	245	-----	10
11	390	390	580	450	1650	2585	1290	650	730	290	245	-----	11
12	390	390	650	450	1780	2445	1180	650	810	290	290	-----	12
13	390	390	650	450	1910	2585	1180	730	730	290	245	-----	13
14	510	450	730	510	2050	2735	1530	730	730	290	245	-----	14
15	450	390	810	580	2050	2990	1650	650	650	290	245	-----	15
16	390	390	650	650	1910	2990	1650	650	650	290	245	-----	16

17	390	390	580	730	1780	2735	1650	650	580	290	290	-----	17
18	390	390	510	580	1650	2735	1530	730	510	245	290	-----	18
19	450	390	580	450	1530	2735	1650	730	450	290	245	-----	19
20	510	390	510	510	2315	2585	1650	650	450	245	245	-----	20
21	510	390	450	580	2585	2445	1650	810	450	245	245	-----	21
22	510	450	390	650	2990	2190	1650	730	390	245	290	-----	22
23	580	510	390	730	2585	2190	1290	730	390	245	245	-----	23
24	580	390	390	810	2445	2050	1080	730	390	245	245	-----	24
25	510	390	340	910	2190	1910	990	810	390	245	---	-----	25
26	450	450	390	990	2315	1780	900	730	390	245	-----	-----	26
27	390	450	390	990	2315	1650	900	650	390	245	-----	-----	27
28	390	510	390	990	2445	1650	900	650	450	290	-----	-----	28
29	390	-----	340	990	2735	1410	810	730	450	245	-----	-----	29
30	390	-----	340	1080	3210	1290	730	730	450	245	-----	-----	30
31	450	-----	340	-----	4400	-----	730	650	-----	245	-----	-----	31
Mean	413	420	505	661	1959	2704	1396	710	551	297	256	-----	Mean

TABLE SHOWING DAILY MEAN DISCHARGE

IN CUBIC FEET PER SECOND OF TIME OF THE RIO GRANDE, AT DEL NORTE, FURNISHED BY THE UNITED STATES GEOLOGICAL SURVEY FOR
1893.

Day	Jan.	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day
1	1113	-----	-----	326	862	2550	640	404	326	308	243	345	1
2	1074	-----	-----	345	829	2700	554	450	345	290	243	300	2
3	1074	-----	-----	365	796	2700	527	450	345	290	243	228	3
4	1074	-----	-----	427	764	2850	475	404	326	290	230	300	4
5	1074	-----	-----	500	732	2550	450	326	290	280	228	404	5
6	1074	-----	-----	475	732	2260	450	326	290	274	220	450	6
7	1037	-----	-----	450	796	2260	427	308	290	260	214	500	7
8	1037	-----	-----	427	796	2700	404	326	274	258	214	600	8
9	1000	-----	-----	427	862	2700	404	326	258	258	214	700	9
10	1000	-----	-----	427	896	2700	364	308	258	258	220	700	10
11	965	-----	-----	450	1000	2550	384	290	258	250	228	732	11
12	930	-----	-----	427	1277	2400	427	290	243	243	230	700	12
13	930	-----	-----	404	1740	2260	500	274	243	250	243	670	13
14	930	-----	-----	384	1860	1860	450	274	228	258	250	670	14
15	965	-----	-----	364	1925	1740	404	290	228	250	258	670	15
16	965	-----	-----	384	2260	1620	364	308	228	243	258	670	16

17	930	-----	-----	-----	404	2550	1510	345	308	258	250	258	670	17
18	930	-----	-----	-----	450	3320	1410	326	308	290	258	250	700	18
19	896	-----	-----	-----	475	3320	1320	364	326	274	250	243	700	19
20	896	-----	-----	-----	450	3240	1234	308	326	274	243	250	670	20
21	862	-----	-----	-----	450	3240	1113	308	345	258	245	258	670	21
22	862	-----	-----	-----	500	3080	1000	290	345	258	243	260	670	22
23	862	-----	-----	-----	527	3240	1000	290	326	258	250	274	700	23
24	862	-----	-----	-----	610	3160	930	326	308	243	258	300	750	24
25	862	-----	-----	-----	764	2925	862	345	290	238	258	404	796	25
26	866	-----	-----	-----	862	2550	827	364	274	258	258	420	800	26
27	930	-----	-----	-----	930	2330	796	364	258	274	250	450	862	27
28	965	-----	-----	-----	965	2260	732	364	326	290	243	430	830	28
29	1000	-----	-----	-----	1037	2120	670	326	326	308	250	427	829	29
30	965	-----	-----	-----	1000	2330	670	326	308	290	258	400	800	30
31	930	-----	-----	-----	-----	2475	-----	384	326	-----	-----	-----	796	31
Mean	964	-----	-----	-----	533	1944	1749	395	324	273	259	279	641	Mean

TABLE SHOWING DAILY MEAN DISCHARGE

IN CUBIC FEET PER SECOND OF TIME OF THE RIO GRANDE, AT DEL NORTE, ON ALTERNATE DAYS, FURNISHED BY THE
UNITED STATES GEOLOGICAL SURVEY FOR

1894.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day
1	896	1037	1037	427	1074	1410	290	275	290	310	260	---	1
3	930	1037	1074	404	1234	1320	290	260	310	350	260	---	3
5	975	1000	1074	450	1800	1234	290	260	290	330	260	---	5
7	1037	1000	1074	500	1800	1234	290	245	290	330	260	---	7
9	1074	975	1074	450	1925	1074	290	260	330	310	260	---	9
11	1113	1000	975	475	2260	930	290	260	370	290	260	---	11
13	1000	1000	930	527	2550	796	260	275	310	275	245	---	13
15	1037	1000	1037	554	1860	732	245	290	290	260	230	---	15
17	1000	975	1113	527	2120	610	275	310	275	260	230	---	17
19	1037	930	975	670	1510	554	370	330	260	275	215	---	19
21	1000	975	796	796	2120	554	350	390	260	290	215	---	21
23	975	1000	527	975	1410	450	330	430	245	275	230	---	23
25	975	1000	475	527	1234	404	310	390	245	275	215	---	25
27	1000	1000	450	1510	1320	384	275	330	230	260	200	---	27

29	1000	-----	404	1037	1410	345	260	330	290	275	200	-----	29
31	1037	-----	427	-----	-----	-----	260	-----	-----	260	-----	-----	31
Mean	1005	992	840	655	1708	802	292	309	286	289	236	-----	Mean

TABLE SHOWING DAILY MEAN DISCHARGE

IN CUBIC FEET PER SECOND OF TIME OF THE CACHE LA POUDRIE RIVER, AT GAUGING STATION, FOR
1893.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day
1	-----	-----	-----	-----	-----	-----	1144	336	-----	-----	-----	-----	1
2	-----	-----	-----	-----	-----	-----	1038	343	-----	-----	-----	-----	2
3	-----	-----	-----	-----	-----	-----	996	321	-----	-----	-----	-----	3
4	-----	-----	-----	-----	-----	1230	997	282	-----	-----	-----	-----	4
5	-----	-----	-----	-----	-----	1108	947	256	-----	-----	-----	-----	5
6	-----	-----	-----	-----	-----	1041	895	251	-----	-----	-----	-----	6
7	-----	-----	-----	-----	-----	1197	840	251	-----	-----	-----	-----	7
8	-----	-----	-----	-----	-----	1767	833	293	-----	-----	-----	-----	8
9	-----	-----	-----	-----	-----	2198	744	327	-----	-----	-----	-----	9
10	-----	-----	-----	-----	-----	2667	693	298	-----	-----	-----	-----	10
11	-----	-----	-----	-----	217	2912	663	-----	-----	-----	-----	-----	11
12	-----	-----	-----	-----	344	2949	678	-----	-----	-----	-----	-----	12
13	-----	-----	-----	-----	278	2252	661	-----	-----	-----	-----	-----	13
14	-----	-----	-----	-----	308	-----	602	-----	-----	-----	-----	-----	14
15	-----	-----	-----	-----	-----	-----	608	-----	-----	-----	-----	-----	15
16	-----	-----	-----	-----	-----	-----	576	-----	-----	-----	-----	-----	16

[illegible]

TABLE SHOWING DAILY MEAN DISCHARGE

IN CUBIC FEET PER SECOND OF TIME OF THE CACHE LA POUDDRE RIVER, AT GAUGING STATION, FOR
1894.

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day
1	-----	-----	-----	-----	-----	2652*	1109	479	171	144	79	-----	1
2	-----	-----	-----	-----	492	2820	1082	494	182	158	91	-----	2
3	-----	-----	-----	-----	481	3046	1109	512	178	135	96	-----	3
4	-----	-----	-----	-----	483	3206	1273	440	179	141	-----	-----	4
5	-----	-----	-----	-----	572	3461	1234	379	161	118	-----	-----	5
6	-----	-----	-----	-----	663	3672	1158	396	152	146	-----	-----	6
7	-----	-----	-----	-----	793	3514	1078	513	140	151	91	-----	7
8	-----	-----	-----	-----	1057	2782	956	487	227	143	95	-----	8
9	-----	-----	-----	-----	1299	2094	925	477	296	128	96	-----	9
10	-----	-----	-----	-----	1208	1908	925	464	281	131	93	-----	10
11	-----	-----	-----	-----	1246	2067	923	427	276	120	89	-----	11
12	-----	-----	-----	-----	1321	2236	936	393	246	107	94	-----	12
13	-----	-----	-----	-----	1453	2346	1177	362	219	99	85	-----	13
14	-----	-----	-----	-----	1538	2291	878	365	178	94	80	-----	14
15	-----	-----	-----	-----	1829	2104	982	369	165	93	85	-----	15
16	-----	-----	-----	-----	1838	2027	899	347	155	93	77	-----	16

17	17	1355	1791	782	319	157	93	42	---	17
18	18	1315	1915	817	298	152	93	116	---	18
19	19	1697	1717	820	295	146	89	150	---	19
20	20	1842	1586	728	282	135	97	146	---	20
21	21	2051	1452	696	278	118	82	115	---	21
22	22	1779	1458	647	271	113	85	107	---	22
23	23	1585	1427	602	274	108	87	60†	---	23
24	24	1302	1375	567	240	105	84	57†	---	24
25	25	1483	1250	561	229	108	84	103	---	25
26	26	1650*	1216	567	212	107	84	90	---	26
27	27	1817*	1228	553	204	101	78	92	---	27
28	28	1984*	1120	522	179	99	74	91	---	28
29	29	2151*	1065	497	182	132	71	89	---	29
30	30	2318*	1067	461	165	145	71	93	---	30
31	31	2485*	-----	444	162	-----	78	-----	---	31
Mean	Mean	1436	2063	833	339	164	105	95	-----	Mean

*Interpolated. †Float stopped by ice.

SEEPAGE WATERS.

The measurements of the returns and seepage waters of the South Platte river were continued by this department in the fall of 1893, and in 1894, with the co-operation of the engineering department of the Agricultural College, with the object in view of showing, if possible, if there were any marked increase of underground waters coming into the South Platte river from Lone Tree, Box Elder, Crow, Kiowa, Bijou, Pawnee and Cedar creeks. These streams are of considerable length, and drain a large scope of country, while most of them have living waters at or toward their heads. It, therefore, seemed reasonable to suppose that a portion of the water must find its way to the greater basin (the South Platte river), along the channels of these streams; but the gaugings of this fall would hardly indicate that the water followed the basin to any marked degree. Gaugings of the river were made above and below where the valleys of these streams opened into that of the South Platte.

In 1893 the work was carried as far as Iliff, where river measurement showed but 5.72 cubic feet per second, and this soon disappeared in the sands, only to reappear in water holes. The entire gain up to this point of seepage water was 572.99 cubic feet per second, or a gain of 430.56 per cent. over that in the river at the canon at the time of measurement. The gain was quite uniform until a point above the Putnam ditch was reached, and here a loss of 21.45 cubic feet occurred, and it seemed possible that an extra head, due to the closing down of the Latham ditch a few days prior, might have been passed between this and the preceding measurement. From this on the river showed an increase, although the gain per mile diminishes as we pass on where less irrigation is practiced.

In the fall of 1894 the measurements were made on the lower Platte, first commencing at the mouth of the Cache la Poudre river, and carried through to the state line; thence from the canon to the mouth of the

Cache la Poudre river. From the canon to Littleton, the river showed a marked increase over the previous year, but about the same as in 1891. Then to Denver it showed a very abnormal increase; but as the two measurements at Littleton and Denver were made only a few hours apart, and again checked up at Denver the next morning, it seems impossible that any change of the river could have interfered with the measurements. At the Burlington ditch the two river measurements at night and the following morning showed a fall in the river of nearly 100 cubic feet per second, presumably caused by the few previous days of cold weather.

From this to the mouth of the Poudre, the river was very steady, and showed no practical rise or fall during the night, and the increase was quite evenly distributed. From this point the river measurements were made very frequently, and where convenient were measured at the same place, both night and morning. The greatest gain was shown below the Hoover ditch, where 13.72 cubic feet per mile was found. This is followed by a loss of 17.02 cubic feet per mile, and this should include the seepage of Box Elder and Crow creeks. From this on to the head of the Platte and Beaver canal a decided gain was shown, but at this point a loss of 11.36 cubic feet is found; and this should again include the seepage of Bijou creek. Thence to Crook there is a gain, but from this to the state line there is a loss in the broad, sandy channel of the river. At the state line there was only 1.90 cubic feet.

The seepage measurements of the Cache la Poudre for the two years have been continued by the engineering department of the Agricultural College, and the tables furnished us for publication.

TABLE OF MEASUREMENTS OF SEEPAGE WATER

IN THE SOUTH PLATTE RIVER, COLORADO, OCTOBER 30 TO NOVEMBER 10, 1893.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & — the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
South Platte River	133.08	---	---	---	---	---	---	---	---	Above High Line Canal
High Line Canal	---	108.83	---	---	---	---	---	---	---	---
Platte Canon Canal	---	14.66	---	---	---	---	---	---	---	---
Citizens' Water Co	---	5.02	---	---	---	---	---	---	---	---
Last Chance Ditch	---	4.20	---	---	---	---	---	---	---	---
City Ditch	---	7.77	---	---	---	---	---	---	---	---
South Platte River	11.01	---	---	151.49	18.41	---	18.43	13.83	6 M=3.07	Below City Ditch
Plum Creek	---	---	5.73	---	---	---	---	---	---	---
Nevada Ditch	---	3.91	---	---	---	---	---	---	---	---
Marcy Gulch	---	---	1.21	---	---	---	---	---	---	---
Spring Gulch	---	---	0.45	---	---	---	---	---	---	---
Lee Gulch	---	---	0.79	---	---	---	---	---	---	---

South Platte River	38.81	-----	-----	174.99	23.50	-----	41.91	31.49	6 M=3.92	-----At Littleton
Bear Creek	-----	-----	7.13	-----	-----	-----	-----	-----	-----	-----
American Water Co.	-----	14.01	-----	-----	-----	-----	-----	-----	-----	-----
Little Dry Creek	-----	-----	0.47	-----	-----	-----	-----	-----	-----	-----
Cherry Creek	-----	-----	3.09	-----	-----	-----	-----	-----	-----	-----
South Platte River	76.76	-----	-----	216.26	41.27	-----	83.18	62.50	10 M=4.13	At 16th Street Viaduct
Farmers and Garden- ers' Ditch	-----	1.21	-----	-----	-----	-----	-----	-----	-----	-----
Burlington Ditch	-----	85.78	-----	-----	-----	-----	-----	-----	-----	-----
Clear Creek	-----	-----	1.25	-----	-----	-----	-----	-----	-----	-----
South Platte River	34.87	-----	-----	260.11	43.85	-----	127.03	95.45	11 M=3.99	Below Fulton Ditch
Brantner Ditch	-----	17.10	-----	-----	-----	-----	-----	-----	-----	-----
Brighton Ditch	-----	7.50	-----	-----	-----	-----	-----	-----	-----	-----
South Platte River	36.15	-----	-----	285.99	25.88	-----	152.91	114.90	7 M=3.56	At Brighton
Platteville Ditch	-----	5.10	-----	-----	-----	-----	-----	-----	-----	-----
South Platte River	89.36	-----	-----	341.82	55.83	-----	208.74	158.36	9 M=6.20	Below Evans Ditch No. 2
Hill Side Ditch	-----	7.64	-----	-----	-----	-----	-----	-----	-----	-----
Beeman Ditch	-----	2.84	-----	-----	-----	-----	-----	-----	-----	-----
Bucker's Ditch	-----	18.30	-----	-----	-----	-----	-----	-----	-----	-----
Independent Ditch	-----	63.90	-----	-----	-----	-----	-----	-----	-----	-----
South Platte River	6.76	-----	-----	351.90	10.08	-----	218.82	164.43	7 M=1.44	At Platteville
St. Vrain Creek	-----	-----	36.31	-----	-----	-----	-----	-----	-----	-----
South Platte River	77.06	-----	-----	385.89	33.99	-----	252.81	189.91	9 M=3.78	Below Union Ditch

TABLE OF MEASUREMENTS OF SEEPAGE WATER—Concluded.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
Big Thompson Creek	---	---	11.34	---	---	---	---	---	---	---
Latham Ditch	---	29.64	---	---	---	---	---	---	---	---
South Platte River	85.89	---	---	413.02	27.12	---	279.93	217.86	7½ M=3.62	At Evans
South Platte River	124.16	---	---	451.29	38.27	---	318.20	239.86	6 M=6.38	Ab've Cache la Poudre R.
Cache la Poudre River	---	---	64.11	---	---	---	---	---	---	---
South Platte River	257.30	---	---	520.32	69.03	---	387.23	291.12	9 M=7.47	Below Hardin Ditch
Choat's Ditch	---	4.05	---	---	---	---	---	---	---	---
Putnam Ditch	---	12.28	---	---	---	---	---	---	---	---
South Platte River	219.52	---	---	498.87	21.45	21.45	365.78	274.86	11 M= Loss, 1.95	Above Putnam Ditch
Weldoon Valley Ditch	---	30.70	---	---	---	---	---	---	---	---
Fort Morgan Canal	---	132.08	---	---	---	---	---	---	---	---
South Platte River	105.29	---	---	547.42	48.55	---	414.33	310.58	14 M=3.47	Below Ft. Morgan Ditch
Deuel & Snyder Ditch	---	4.11	---	---	---	---	---	---	---	---
South Platte River	151.49	---	---	597.73	50.31	---	464.64	349.14	9 M=5.57	Below P. & B. Canal

[illegible]

TABLE OF MEASUREMENTS OF SEEPAGE WATER

IN THE SOUTH PLATTE RIVER, COLORADO, OCTOBER 16 TO NOVEMBER 4, 1894.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & — the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
South Platte River.....	185.60	---	---	---	---	---	---	---	---	{ Above dam of High Line Canal.
High Line Canal.....	---	112.46	---	---	---	---	---	---	---	---
Union Water Co.....	---	32.50	---	---	---	---	---	---	---	---
Platte Canon Canal.....	---	19.95	---	---	---	---	---	---	---	---
Last Chance Ditch.....	---	15.75	---	---	---	---	---	---	---	---
City Ditch.....	---	15.27	---	---	---	---	---	---	---	---
South Platte River.....	38.30	---	---	234.23	49.23	---	49.23	26.52	6 M=8.20	{ 1/4 mile below City Ditch, Oct. 29.
South Platte River.....	31.19	---	---	228.12	---	---	---	---	---	Same place, Oct. 30.
W'st'ge f'm Platte C'n } Canal and Last Ditch }	---	---	15.33	---	---	---	---	---	---	---
Nevada Ditch.....	---	15.57	---	---	---	---	---	---	---	---
Plum Creek.....	---	---	6.34	---	---	---	---	---	---	---
Marcy Gulch.....	---	---	1.98	---	---	---	---	---	---	---

Lee Gulch.....	67.31	1.55	253.71	25.59	74.82	40.31	6 M=4.26	At Littleton
South Platte River.....								
Gulch.....		1.62						Below Littleton
Big Dry Creek.....		1.86						
Bear Creek.....		9.44						
Little Dry Creek.....		9.62						
Union Water Co.....		3.87						Pumping Plant
Cherry Creek.....		13.69						
South Platte River.....	218.59		372.63	118.92	193.74	104.38	10 M=11.89	{ Between 15th and 16th streets, Oct. 30.
South Platte River.....	230.60		384.64					Same place, Oct. 31
Farmers' & Gardener's { Ditch.....		6.81						
South Platte River.....	241.31		402.16	17.52	211.26	113.82	4½ M=3.89	{ Below headgate of Burlington Ditch, Oct. 31.
South Platte River.....	141.36		302.21					Same place, Nov. 1
Clear Creek.....		7.91						
Fulton Ditch.....		60.93						
South Platte River.....	105.14		319.01	16.80	228.06	122.88	6½ M=2.58	Below Fulton Ditch
Brautner Ditch.....		29.59						
Brighton Ditch.....		16.76						
South Platte River.....	108.77		368.99	49.98	278.04	149.82	7 M=7.14	At Brighton
Dry Creek.....		19.40						
Lupton Bottom Ditch.....		7.34						
Platville Ditch.....		27.63						

TABLE OF MEASUREMENTS OF SEEPAGE WATER—Continued.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & — the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
Wastage from Fulton } Ditch	---	---	5.02	---	---	---	---	---	---	Below Evans No. 2 Ditch
South Platte River	134.90	---	---	405.67	36.68	---	314.72	36.68	9 M=4.07	Seepage
Bucker's Ditch	---	16.81	---	---	---	---	---	---	---	---
Independent Ditch	---	49.23	---	---	---	---	---	---	---	---
South Platte River	97.19	---	---	434.00	28.33	---	343.05	184.83	7 M=4.05	At Platteville
Western Drainage and } Irrigation Co. Ditch }	---	5.90	---	---	---	---	---	---	---	Seepage
St. Vrain Creek	---	---	61.74	---	---	---	---	---	---	---
South Platte River	208.68	---	---	489.65	55.65	---	398.70	214.82	9 M=6.18	Below Union Ditch
Big Thompson Creek	---	---	27.98	---	---	---	---	---	---	---
Latham Ditch	---	60.01	---	---	---	---	---	---	---	---
Latham Seepage Ditch	---	14.93	---	---	---	---	---	---	---	---
South Platte River	214.03	---	---	541.46	51.81	---	450.51	242.73	7½ M=6.91	At Evans
Cache la Poudre River	---	---	73.51	---	---	---	---	---	---	{ Below Cache la Poudre
South Platte River	311.89	---	---	565.81	24.35	---	474.86	255.85	6 M=4.06	{ River November 4

[illegible]

TABLE OF MEASUREMENTS OF SEEPAGE WATER—Concluded.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
Deuel & Snyder Ditch	---	3.65	---	---	---	---	---	---	---	---
Platte & Beaver Canal	---	77.28	---	---	---	45.43	631.45	340.22	4 M=loss 11.36	Below Bijou Creek
South Platte River	152.09	---	---	734.69	---	---	---	---	---	---
Platte and Beaver Sup- ply Canal	---	71.90	---	---	51.35	---	682.80	367.67	7 M=7.34	{ Below Platte and Beav- er Supply Canal
South Platte River	131.54	---	---	786.04	---	---	---	---	---	---
Parson Ditch	---	4.95	---	---	---	---	---	---	---	---
Smith Ditch	---	9.06	---	---	---	---	---	---	---	---
South Platte River	142.37	---	---	810.88	24.84	---	707.64	381.25	7½ M=3.31	At Snyder
South Platte River	149.63	---	---	818.14	7.26	---	714.90	385.18	5 M=1.45	Below Big Beaver Creek
South Platte Ditch	---	60.01	---	---	---	---	---	---	---	---
Pawnee Ditch	---	99.55	---	---	---	---	---	---	---	---
South Platte River	31.84	---	---	869.55	51.41	---	766.31	412.88	12½ M=4.11	At Merino
Schnieder Ditch	---	20.33	---	---	---	---	---	---	---	---
Springdale Ditch	---	22.66	---	---	---	---	---	---	---	---

South Platte River.....	20.80	-----	-----	891.86	22.31	-----	788.62	424.90	8¼ M=2.70	---Above Pawnee Creek
South Platte River.....	24.34	-----	-----	895.38	3.52	-----	792.14	426.80	1¾ M=2.01	---Below Pawnee Creek
Smith Ditch.....	-----	2.08	-----	-----	-----	-----	-----	-----	-----	-----
South Platte River.....	30.36	-----	-----	903.50	8.12	-----	800.26	431.17	7½ M=1.08	---Above Cedar Creek
Hill and Platte V'y D'ch	-----	4.14	-----	-----	-----	-----	-----	-----	-----	-----
South Platte River.....	35.93	-----	-----	913.21	9.71	-----	809.97	436.41	1½ M=6.47	---Below Cedar Creek
South Platte River.....	36.07	-----	-----	913.35	0.14	-----	810.11	436.43	18 M=0.01	---2½ miles above Crook
South Platte River.....	1.90	-----	-----	879.18	-----	34.17	775.94	418.02	36 M=loss 0.95	-----At State Line

Cache la Poudre River ..	72.48	----	----	90.37	6.71	----	37.90	72.23	-----	Below Hottell's Mill
Horne Lake Supply } Ditch	----	6.80	----	----	----	----	----	----	-----	-----
Box Elder Ditch	----	1.04	----	----	----	----	----	----	-----	-----
Whitney Ditch	----	0.08	----	----	----	----	----	----	-----	-----
Greeley Canal No. 2	----	60.03	----	----	----	----	----	----	-----	-----
Cache la Poudre River ..	9.84	----	----	95.68	5.31	----	43.21	82.16	15¾ M=0.76	Below No. 2
Cache la Poudre River ..	5.48	----	----	91.32	----	4.36	38.85	73.85	{ 5¼ M= Loss, 0.83 }	Below Eaton Ditch
Jones Ditch	----	0.19	----	----	----	----	----	----	-----	-----
Boyd & Freeman Ditch ..	----	3.65	----	----	----	----	----	----	-----	-----
Cache la Poudre River ..	20.32	----	----	111.00	18.68	----	57.53	109.52	18 M=1.04	At Greeley Pump House
Ogilvy Ditch	----	0.65	----	----	----	----	----	----	-----	-----
Cache la Poudre River ..	43.26	----	----	133.59	23.59	----	81.12	152.58	-----	Below Ogilvy Ditch
Cache la Poudre River ..	60.76	----	----	151.09	17.50	----	98.62	197.76	7 M=2.50	At Mouth

Cache la Poudre River	49.18	-----	-----	101.39	2.18	-----	2.10	7¾ M=0.28	Bel'w Larimer and Weld
Ames' Ditch	-----	1.28	-----	-----	-----	-----	-----	-----	-----
Lake Canal	-----	0.16	-----	-----	-----	-----	-----	-----	-----
Horner Supply Ditch	-----	49.70	-----	-----	-----	-----	-----	-----	-----
Cache la Poudre River	1.49	-----	-----	104.84	3.45	-----	5.60	-----	{ Below Horner Supply Ditch
Box Elder Ditch	-----	0.11	-----	-----	-----	-----	-----	-----	-----
Horner Supply Ditch	-----	-----	23.90	-----	-----	-----	-----	-----	Wastage
Greeley Canal No. 2	-----	27.17	-----	-----	-----	-----	-----	-----	-----
Cache la Poudre River	1.43	-----	-----	108.16	3.32	-----	9.03	15¾ M=0.43	{ Below Greeley Canal No. 2
Eaton Ditch	-----	0.08	-----	-----	-----	-----	-----	-----	-----
Cache la Poudre River	20.44	-----	-----	127.25	19.09	-----	28.26	5¼ M=3.71	Below Eaton Ditch
Greeley Canal No. 3	-----	0.12	-----	-----	-----	-----	-----	-----	-----
Boyd & Freeman	-----	0.12	-----	-----	-----	-----	-----	-----	-----
Cache la Poudre River	46.46	-----	-----	153.51	26.26	-----	54.73	18 M=1.46	At Pump House
Cache la Poudre River	56.51	-----	-----	163.56	10.05	-----	64.86	-----	Below Ogilvy Ditch
Cache la Poudre River	76.93	-----	-----	183.98	20.42	-----	85.45	7 M=4.35	At Mouth

TABLE OF MEASUREMENTS OF SEEPAGE WATER

IN THE CACHE LA POUDDRE RIVER, COLORADO, AUGUST 20 TO AUGUST 24, 1894.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & — the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
Cache la Poudre River	268.07	---	---	---	---	---	---	---	---	Gauging Stat'n at Canon
Canon Ditch	---	0.80	---	---	---	---	---	---	---	---
Pleasant Valley and Lake Canal	---	23.63	---	---	---	---	---	---	---	---
Larimer County Canal	---	31.39	---	---	---	---	---	---	---	---
Jackson Ditch	---	11.17	---	---	---	---	---	---	---	---
New Mercer Ditch	---	3.42	---	---	---	---	---	---	---	---
City Water Works	---	0.60	---	---	---	---	---	---	---	---
Little Cache la Poudre Canal	---	7.87	---	---	---	---	---	---	---	---
Taylor & Gill Ditch	---	4.46	---	---	---	---	---	---	---	---
Chamberlin Ditch	---	4.53	---	---	---	---	---	---	---	---
Larimer & Weld Canal	---	27.80	---	---	---	---	---	---	---	---
Cache la Poudre River	153.17	---	---	268.84	0.77	---	0.77	0.29	$7\frac{3}{4}$ M=0.10	{ Below Larimer and Weld Canal

[illegible]

TABLE OF MEASUREMENTS OF SEEPAGE WATER—Concluded.

NAMES OF STREAMS AND DITCHES WHERE MEASUREMENTS WERE TAKEN	Amount of water in river	Amount of water di- verted from river by canals	Amount of inflow from natural trib- utaries	Amount of water in river at points meas- ured, plus that di- verted by canals & — the inflow from natural tributaries	Amount of increase in volume of river between points measured	Decrease in volume of river between points measured	Amount of increase in volume of river from the gauging station, at Canon, to point where last measured	Per cent. of increase in volume from gauging station, at Canon, to point last measured	Increase per mile be- tween points meas- ured	REMARKS
Cache la Poudre River --	18.13	---	---	325.41	21.14	---	59.25	22.10	5½ M=3.84	----- At Pump House
Ogilvey Ditch -----	---	38.39	---	---	---	---	---	---	---	-----
Camp Bros' Supply Dt'h	---	1.17	---	---	---	---	---	---	---	-----
Cache la Poudre River --	4.93	---	---	351.77	26.36	---	85.61	31.94	3¼ M=8.11	----- Below River Supply
Cache la Poudre River --	32.90	---	---	379.74	27.97	---	113.58	42.33	3¾ M=7.46	----- ½ mile A bove Mouth

COMPARATIVE TABLE

SHOWING THE INCREASE IN VOLUME OF THE SOUTH PLATTE RIVER,
AND RETURN OF WASTE OR SEEPAGE WATER.

PLACES WHERE MEASUREMENTS WERE TAKEN	Amount of Increase in Volume of River, from the Canon to Point Measured, Minus the In- flow from Natural Tributaries					
	Oct. 1889	Oct. 1890	Oct. 1891	Mch. 1892	Oct. 1893	Oct. 1894
River below head of City Ditch..	-----	-----	27.57	25.32	18.41	49.23
River at Littleton.....	49.91	11.73	80.18	69.95	41.91	74.82
River at Denver.....	50.91	55.61	96.38	129.56	83.18	193.74
River at Fulton Ditch.....	-----	94.41	138.85	141.51	127.03	228.06
River at Brighton.....	77.07	98.91	175.19	116.16	152.91	278.04
River at Elwood and Wheeler } Ditch	119.10	172.35	218.69	136.33	208.74	314.72
River at Platteville.....	133.38	-----	226.93	180.54	218.82	343.05
River above St. Vrain.....	-----	155.80	233.32	-----	-----	-----
River at Union Ditch.....	-----	-----	-----	-----	252.81	298.70
River at Latham Ditch.....	197.00	176.91	299.21	192.86	279.93	450.51
River at Poudre.....	-----	215.20	326.13	216.17	318.20	474.86
River at Hoover Ditch.....	277.10	351.66	392.66	285.25	387.23	549.75
River at Putnam Ditch	-----	333.60	418.86	330.61	365.78	549.12
River at Ft. Morgan Canal.....	305.92	360.58	434.05	360.09	414.33	617.43
River at Platte and Beaver Canal	307.03	367.09	472.14	431.74	464.64	676.88
River at Snyder.....	-----	384.18	470.60	-----	479.67	707.64
River at Merino.....	385.54	405.71	550.33	-----	514.39	766.31
River at Sterling.....	418.33	435.16	583.69	-----	548.15	-----
River 2 miles above Iliff.....	422.77	449.21	611.76	-----	572.99	810.11
River 2 miles above Crook.....	-----	-----	598.69	-----	-----	-----
River at State Line.....	-----	-----	602.00	-----	-----	775.94

WEIR MEASUREMENTS.

The increasing demands for further information concerning weir measurements, and the growing needs of a more accurate method of measuring water, has induced this department to publish the tables of discharge over weirs, as revised by Prof. L. G. Carpenter, of the State Agricultural College, at Fort Collins, and issued in bulletin No. 27 of the experiment station of that institution. "The weir measurement is accurate, provided the proper conditions are observed," and should be more widely known throughout the irrigation sections.

This department is very highly indebted to Prof. Carpenter for the consent to insert the following portion of the bulletin in this report.

PORTER J. PRESTON,
Deputy Gauger.

CONDITIONS FOR THE WEIR, EITHER RECTANGULAR OR TRAPEZOIDAL.

In nearly all cases, the weirs placed for measurement, are not placed with sufficient care to make the measurement one of great accuracy. The present demand for water, which is to increase, will gradually require more care in every detail. The weirs commonly used are of timber with board sills and sides, not usually made in a wide enough or deep enough channel.

With the more pressing demand for exact measurement which is coming already in northern Colorado, companies will soon be justified in constructing permanent weirs with much care. Under the Canale Villoresi, where the Cippoletti weir was first used, all the weirs examined by the writer were constructed of cut stone, and the crests and sides were made of iron plates, the whole made with care so as to remain useful for generations to come.

If the following conditions are followed in constructing a weir, whether it be rectangular or trapezoidal, the weir formula may be used with confidence that no single cause will produce an error greater than one-half of 1 per cent. The conditions are essentially the same as those either of Francis or of Cippoletti.*

1. That the channel leading to the weir be of constant cross-section, its axis passing through the middle of the weir, and perpendicular to it; this straight reach to be of such length that the water

*Canale Villoresi, *Modulo per la Dispensa delle Acqua*, etc., Milan 1886, published by the Societa Italiana per Condotte d'Acqua.

flows with uniform velocity, without internal agitation or eddies. This should be not less than fifty or sixty feet, more if possible.

2. Only by making the contraction complete on both sides and bottom can the co-efficient α in the formula have a value free from uncertainty, and to secure complete contraction it is necessary :

(a.)—That the opening of the weir be made in a plane surface, perpendicular to the course of the water.

(b.)—That the opening itself have a sharp edge on the upstream face, and its walls cut away so that their thickness at the point of discharge shall not be above one-tenth the depth for depths below five inches, nor above one-quarter the depth for depths from five to twenty-four inches.

(c.)—That the distance of the sill of the weir from the bottom of the canal be at least three times the depth on the weir.

(d.)—That the distance of the sill of the weir from the sides of the channel, be at least twice the depth of the water flowing over the wier.

(e.)—That the lateral contraction remaining undistnrbed, the length of the weir shall be three or, better, four times the depth of the water flowing over.

(f.)—That the depth of water flowing over the weir shall not be less than three inches.

3. The velocity of approach must be very small ; for weirs three feet long and depth of twelve inches, it ought not to be greater than six inches per second ; for weirs of six feet long and depth of twenty-four inches, it ought not to be above eight inches per second. In all these cases the cross-section of the canal of approach ought to be at least seven times that of the weir. Other conditions affecting the velocity of approach are included in c , d , and e , respecting complete contraction.*

4. The layer of falling water should be perfectly free from the walls below the weir, in order that air may freely circulate underneath. For short weirs it is sufficient that the lateral walls of the lower canal be free from the sides of the weir. In such case, when air freely passes underneath, the level of the water in the lower canal has no influence on the discharge of the weir, unless it reaches or exceeds the level of the crest.

5. The depth of the water should be measured with accuracy where the suction of the flow does not effect the height and where it is free from influences such as the wind, or the movement of the water, which can effect the true level. The height should be read to within 1-300 of the depth in order that the error may be within one-half of 1 per cent.

6. The weir ought to be constructed with care and carefully located. It should not vary more than four degrees from being perpendicular to the channel. Its sills should be horizontal.

*Table I will aid in obtaining proper proportion between the channel of approach and the weir.

The disturbing causes may be divided into three classes ; those which always tend to increase the discharge over the computed amount ; those which always tend to decrease the amount ; and those which may either increase or decrease the amount, one being as likely to occur as the other, and in the long run tending to balance each other.

The measurement of the depth of water is in general as likely to be too great as too small, with careful measurement, and the errors due to this may be neglected.

The effect of obliquity of the weir, or of eddies, is to decrease the flow below the computed amount.

The effect of any velocity of the water as it approaches the weir, of the nearness of the sides or bottom to the weir, incomplete contraction, of a crest not perfectly sharp, of air not having access beneath the sheet of falling water, etc., the effect of each of these is to increase the discharge.

The causes tending to increase the discharge evidently outnumber those tending to decrease it, and are, all things being taken into account, more difficult to overcome.

It is frequently not possible to meet all the conditions. But the errors due to the weir not being vertical, or horizontal, or perpendicular to the current, or for crest not being sharp, can be obviated by careful construction.

If the weir is not vertical, the discharge is increased or diminished, according as the inclination may be down or up stream. The correction amounts to 4 per cent. for inclinations as great as one horizontal to three vertical, or for angles of about 18 degrees.* For less inclinations the correction would be less.

The effect of nearness of the sides in increasing the discharge, amounts to about 1 per cent. when the distance is equal to the depth of the water on the weir, about one-third of 1 per cent. when the distance is one and one-half times the depth, and may be neglected when over twice the depth of water on the weir.

The effect of nearness of floor is to increase the discharge. When the depth below the crest is three times the depth over the weir the increase is insensible; if 2.5 times the depth, is less than one-half of 1 per cent., if two times the depth nearly 1 per cent., if equal to the depth, is 1.5 per cent. and if but one-half the depth, over 2 per cent. The amount of this varies with other conditions.

An increase of temperature seems to increase the discharge, and the presence of sediment has the same effect through action on the surface tension of the liquid. With large openings the effect of the temperature is less than with small. Under present conditions they need to be neglected. Their influence is small.

The velocity of approach is, all things considered, the most difficult to reduce within reasonable limits, and the errors thus introduced

*From experiments made by M. Bazin, *Annales des Ponts et Chaussées*, Jan. 1890. Translated in *Proc. Engrs. Club, of Phila.* by Marichal and Trautwine. Also Trautwine's *Engrs. Pocket Book*, 16th ed., p. 267-1.

in ordinary measurement are the most considerable. It is not possible to entirely prevent velocity in the approaching water, but, by properly proportioning the size of the channel to the opening of the weir, the velocity may be reduced to such limits that its effects may be neglected. A comparison of tables I. and II. for allowing for velocity of approach will show this. As the water for irrigation is liable at times to carry sediment, the space in front of the weir, under most conditions, is liable to fill up. The water being thus confined to a smaller cross-section, the velocity is augmented, increasing the discharge for the same depth over the weir. It is troublesome to make the computation for the allowance for velocity of approach, the better way being to keep within the bounds indicated by the conditions on pages 201-2 or within limits indicated by study of tables I. and II.

As the effect of the causes which tend to increase the discharge cannot be entirely eliminated, the tendency is to increase the discharge. In consequence of this, Cippoletti proposed to increase the amount as computed by the Francis formula by 1 per cent. making the formula

$$Q=3.36\frac{2}{3} LH^{\frac{3}{2}}.$$

But as it seems probable that the coefficient of discharge assumed by him was too large, the ordinary formula will be better to use in the dearth of sufficiency of experimental knowledge.

The Cippoletti form of weir, because of the reasons already given has the most advantages of any module known to the writer for measurement of water for irrigation purposes. It is reliable to within 2 per cent. with the Francis formula, if placed according to the conditions given, and probably within 1 per cent. The ordinary methods of measuring or guessing at the discharge of water vary from 40 to 400 per cent., as usually used. All that may be said of its advantages, save the one of having the effective length of the sill in proportion to the actual length of the sill, is true of the rectangular weir also. It meets most of the conditions for a good module. It lacks means of self-adjustment, or of preserving constant heights of water. Where adapted, the spill-box may be used in connection with it, when that condition would be very nearly met. Several canals have introduced essentially this combination, and so far as reports have reached the writer they have been satisfactory.

EXPLANATION OF TABLES.

Tables I. and II. in the appendix are for the purpose of correcting to allow for the errors due to velocities in the approaching water without the troublesome calculations indicated.

Table I. is an auxiliary table giving the average velocity through the weir for different velocities over the weir. It may be used to determine the velocity of the water as it approaches the weir under known conditions, or with the aid of the second table, to determine the proper conditions of the size of the channel, in order to bring the errors within assigned limits. The velocity given is the average velocity in the plane of the weir. If, then, the cross-section of the channel

above the weir is no larger than the weir itself, the velocity of the water through the section would be the same as that of the table. If the section is twice that of the weir, then the velocity is one-half that of the table.

Table II. is computed from the Fteley formula and expresses the increase due to velocity over that given in the tables III.-VI. To use, the discharge as given in tables III.-VI. is determined, and the correction is applied according to the given depth over the weir and the velocity of approach. The correction is expressed in per cent. The formula is based on experiments limited to 2.5 feet per second. For greater velocities, therefore, it is possible that the quantities given are in error.

EXAMPLE.—What correction to allow for the velocity of two feet per second, the water passing over weir one foot deep. Find at top the column with depth one foot, and at left find line with velocity of two feet per second. Follow the line to the right and in the column with depth one foot the number 14.3 is found which is the number of per cent. by which the discharge is increased.

Tables III. and IV. are newly computed for this edition, and give the discharges over weirs with the depths measured in inches and fractions corresponding to the divisions on the rules ordinarily in use. They are computed from modified forms of the Francis formula, the depths being measured in inches.

Table III. is computed from the formula $Q = .006675 LH^{\frac{3}{2}}$, Q being in cubic feet per second, L and H in inches.

Table IV. is computed from $Q = .080107 LH^{\frac{3}{2}}$, where Q is in cubic feet per second, L is in feet, H is in inches. It is the Francis formula with the units changed.

Tables V. and VI. were given in previous editions, but the depths being given in decimals of feet were not so convenient for use with scales which most people possessed which are divided into feet, inches and fractions.

In table III. the discharge is given for a weir one inch long, forming a portion of a longer weir, and for all depths up to thirty inches, the depths varying by sixteenths of inches. The even inches are given in the left hand column and fractions at the top of the page. The discharge for the corresponding inch and fraction is found at the intersection of the line of the even inch and the column of the fraction. Where there are contractions, the amounts to be subtracted are given in the second column. These are given for intervals of half inches, the quantities there given being for the even inch or half inch of the adjoining column, and for two complete contractions.

EXAMPLE.—What is the discharge over a weir forty-five inches long and with a depth of eleven and one quarter inches with two complete contractions? Find eleven inches at the left of the page, and the column headed one-quarter inch at the head of the page. Follow this column down until it intersects the line of the eleven. At the intersection is the discharge for a portion of the weir one inch long, which is .2519 cubic feet per second. Then for a weir forty-five inches long it is forty-five times as much, or 11.3345 second feet, if without contraction. The second column gives the allowance for contraction for eleven inches depth; the eleventh column for a depth of eleven and one-half inches. For eleven and one-quarter inches we then take a value intermediate between those for eleven inches and eleven and one-half inches, obtaining the correction .567, the amount by which the discharge is reduced. This, then, leaves the total discharge as $11.335 - .567 = 10.77$ second feet.

Table IV. is used in exactly the same way. In this table the discharge is given for a portion of a weir one foot long, while No. III. gives it for a weir one inch long. These two tables are consequently adapted to weirs of any length, but require multiplication.

Tables V. and VI. give the discharge for weirs of certain lengths, for different depths, and without multiplication. Where companies adopt weirs for measurement, it is far more convenient to adopt certain standard lengths and make all weirs conform thereto.

Table V. gives the discharge over rectangular weirs for depths varying by .025 of a foot and for various lengths of weir. These tables give the discharge with two complete contractions. In case there is no contraction, then the amount in the right hand column may be added to the amounts given in the tables.

Table VI. is for rectangular weirs without contraction—which may also be found from table V. and for the Cippoletti trapezoidal weirs. It will be noticed here that the discharges given in the various columns are directly proportional to the length of the weir, while in table V. they are not. The amounts are 1 per cent. greater than given in table V. The quantities in table V. were computed with the constant $3\frac{1}{3}$ instead of 3.33 ordinarily used, making the quantities one-tenth of 1 per cent. greater than given by most tables. Table VI., intended for trapezoidal weirs, is 1 per cent. greater than corresponding discharges of table V.

Depth in all cases in the following tables is measured in still water:

TABLE I.

AUXILIARY TABLE FOR APPROXIMATING VELOCITY OF APPROACH.

Depth of water over weir			Average velocity in section of weir		
In ft.	In in.	In ft. per sec.	In ft.	In in.	In ft. per sec.
0.25	3	1.665	1.75	21	4.400
0.50	6	2.354	2.00	24	4.709
0.75	9	2.884	2.25	27	4.995
1.00	12	3.330	2.50	30	5.265
0.25	15	3.723	2.75	33	5.510
1.50	18	4.078	3.00	36	5.765

TABLE II.

CORRECTIONS IN PER CENT. FOR VELOCITY OF APPROACH, TO BE APPLIED TO VALUES OBTAINED FROM TABLES III TO VI.

Velocity	Head *	DEPTH OVER WEIR, IN FEET											
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
0.25	.0010	0.8	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.50	.0039	3.5	1.8	1.2	0.9	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3
0.75	.0087	8.0	4.0	2.6	2.0	1.6	1.3	1.1	1.0	0.9	0.8	0.7	0.7
1.00	.0155	14.3	7.1	4.7	3.5	2.8	2.3	2.0	1.8	1.6	1.4	1.3	1.2
1.25	.0243	22.6	11.1	7.4	5.5	4.4	3.7	3.1	2.7	2.4	2.2	2.0	1.8
1.50	.0350	33.1	16.1	10.7	8.0	6.4	5.3	4.5	4.0	3.5	3.2	2.9	2.6
1.75	.0476	45.7	22.2	14.6	10.9	8.7	7.2	6.2	5.4	4.8	4.3	3.9	3.6
2.00	.0622	60.9	29.2	19.2	14.3	11.4	9.5	8.1	7.1	6.3	5.6	5.1	4.7
2.25	.0787	78.6	37.4	24.5	18.2	14.5	12.0	10.3	9.0	8.0	7.2	6.5	6.0
2.50	.0971	99.1	46.7	30.5	22.6	18.0	14.9	12.7	11.1	9.9	8.9	8.0	7.4
2.75	.1175	121.8	56.9	37.0	27.4	21.8	18.0	15.4	13.4	11.9	10.7	9.7	8.9
3.00	.1398	149.4	69.1	44.8	33.1	26.2	21.7	18.5	16.1	14.3	12.8	11.7	10.7
3.25	.1641	179.6	82.3	53.1	39.1	30.9	25.6	21.8	19.0	16.9	15.1	13.7	12.6

3.50	.1903	213.5	96.9	61.7	45.7	36.1	29.9	25.4	22.2	19.6	17.6	16.0	14.6
3.75	.2185	251.3	113.0	72.3	53.0	41.8	34.5	29.4	25.6	22.6	20.3	18.4	16.8
4.00	.2486	293.1	130.7	82.6	60.9	47.9	39.5	33.6	29.2	25.9	23.2	21.0	19.2

* Head = $\frac{v^2}{64.36}$ v being velocity in feet per second, in first column.

TABLE III.

DISCHARGE OVER WEIR ONE INCH LONG, IN CUBIC FEET PER SECOND.

Depth Inches	Correction to be subtracted for two side con- tractions	0	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$
3	.0208	.0347	.0358	.0369	.0380	.0391	.0402	.0414	.0425
4	.0427	.0534	.0547	.0559	.0572	.0585	.0598	.0611	.0624
5	.0746	.0746	.0760	.0775	.0789	.0803	.0817	.0832	.0846
6	.1177	.0981	.0997	.1012	.1027	.1043	.1059	.1075	.1090
7	.1732	.1236	.1253	.1270	.1286	.1303	.1321	.1337	.1354
8	.2417	.1511	.1528	.1546	.1564	.1582	.1600	.1618	.1636
9	.3244	.1802	.1821	.1840	.1859	.1878	.1897	.1916	.1935
10	.4222	.2111	.2131	.2151	.2171	.2191	.2211	.2231	.2251
11	.5358	.2435	.2456	.2477	.2498	.2519	.2540	.2561	.2582
12	.6660	.2775	.2797	.2818	.2840	.2862	.2884	.2906	.2928
13	.8135	.3129	.3152	.3174	.3197	.3220	.3243	.3265	.3288
14	.9791	.3497	.3520	.3544	.3567	.3591	.3615	.3638	.3662
15	1.1634	.3878	.3902	.3927	.3951	.3976	.4000	.4025	.4049
16	1.3672	.4272	.4297	.4323	.4348	.4373	.4398	.4423	.4449

TABLE III.—Concluded.

Depth, Inches.	Correction to be subtracted for two side con- tractions	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$
3	.0306	.0437	.0449	.0461	.0437	.0485	.0497	.0509	.0522
4	.0574	.0637	.0651	.0664	.0677	.0691	.0705	.0719	.0732
5	.0974	.0861	.0876	.0891	.0905	.0920	.0936	.0951	.0966
6	.1438	.1106	.1122	.1138	.1154	.1171	.1187	.1203	.1220
7	.2057	.1371	.1388	.1406	.1423	.1440	.1458	.1475	.1493
8	.2812	.1654	.1673	.1691	.1709	.1728	.1746	.1765	.1784
9	.3714	.1955	.1974	.1993	.2013	.2032	.2052	.2072	.2091
10	.4770	.2271	.2292	.2312	.2332	.2353	.2373	.2394	.2415
11	.5988	.2603	.2625	.2646	.2667	.2689	.2710	.2732	.2753
12	.7376	.2950	.2972	.2995	.3017	.3039	.3062	.3084	.3106
13	.8940	.3311	.3334	.3357	.3380	.3404	.3427	.3450	.3474
14	1.0689	.3686	.3710	.3734	.3758	.3782	.3806	.3830	.3854
15	1.2628	.4074	.4098	.4123	.4148	.4173	.4198	.4222	.4247
16	1.4765	.4474	.4500	.4525	.4551	.4576	.4602	.4628	.4653
17	1.7105	.4887	.4913	.4940	.4966	.4992	.5019	.5045	.5071

18	1.9654	.5312	.5339	.5366	.5393	.5420	.5447	.5474	.5501
19	2.2418	.5748	.5776	.5804	.5831	.5859	.5887	.5915	.5943
20	2.5404	.6196	.6224	.6253	.6281	.6310	.6338	.6367	.6396
21	2.8614	.6655	.6684	.6713	.6742	.6771	.6801	.6830	.6859
22	3.2061	.7125	.7154	.7184	.7214	.7244	.7274	.7304	.7333
23	3.5743	.7605	.7635	.7666	.7696	.7727	.7757	.7788	.7818
24	3.9668	.8095	.8126	.8157	.8189	.8220	.8251	.8282	.8313
25	4.3840	.8659	.8628	.8659	.8691	.8723	.8755	.8786	.8818
26	4.8265	.9107	.9139	.9171	.9203	.9236	.9268	.9301	.9333
27	5.2948	.9627	.9660	.9693	.9726	.9759	.9792	.9825	.9858
28	5.7894	1.0157	1.0190	1.0224	1.0257	1.0291	1.0324	1.0358	1.0391
29	6.3106	1.0696	1.0730	1.0764	1.0798	1.0832	1.0866	1.0901	1.0935
30	-----	-----	-----	-----	-----	-----	-----	-----	-----

For discharges for depths less than 3 inches, use table Tables V or VI. The absolute error will be small.

TABLE IV.

DISCHARGE OVER WEIR ONE FOOT LONG, IN CUBIC FEET PER SECOND.

Depth, Inches	Correction to be subtracted for two side con- tractions	0	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$
3	0.0208	0.4163	0.4293	0.4425	0.4559	0.4693	0.4829	0.4967	0.5106
4	0.0427	0.6409	0.6559	0.6711	0.6864	0.7019	0.7174	0.7331	0.7488
5	0.0746	0.8956	0.9125	0.9294	0.9465	0.9636	0.9809	0.9983	1.0157
6	0.1177	1.1774	1.1958	1.2143	1.2330	1.2517	1.2705	1.2894	1.3084
7	0.1732	1.4836	1.5035	1.5235	1.5436	1.5638	1.5840	1.6044	1.6221
8	0.2417	1.8126	1.8339	1.8553	1.8767	1.8982	1.9199	1.9415	1.9633
9	0.3244	2.1629	2.1855	2.2081	2.2308	2.2536	2.2765	2.2995	2.3225
10	0.4222	2.5332	2.5570	2.5809	2.6048	2.6288	2.6529	2.6770	2.7013
11	0.5358	2.9225	2.9475	2.9725	2.9976	3.0227	3.0480	3.0733	3.0986
12	0.6660	3.3300	3.3560	3.3822	3.4083	3.4346	3.4609	3.4873	3.5137
13	0.8135	3.7548	3.7819	3.8091	3.8363	3.8636	3.8910	3.9184	3.9459
14	0.9791	4.1963	4.2244	4.2526	4.2808	4.3092	4.3375	4.3660	4.3945
15	1.1634	4.6558	4.6829	4.7121	4.7413	4.7706	4.8000	4.8294	4.8589
16	1.3672	5.1268	5.1569	5.1870	5.2172	5.2475	5.2778	5.3081	5.3386

17	1.5909	5.6149	5.6459	5.6770	5.7081	5.7392	5.7705	5.8017	5.8331
18	1.8353	6.1176	6.1495	6.1814	6.2134	6.2455	6.2776	6.3097	6.3420
19	2.1009	6.6344	6.6671	6.7000	6.7329	6.7658	6.7987	6.8318	6.8648
20	2.3883	7.1650	7.1986	7.2323	7.2660	7.2997	7.3336	7.3674	7.4014
21	2.6982	7.7090	7.7435	7.7780	7.8125	7.8471	7.8817	7.9164	7.9512
22	3.0309	8.2662	8.3014	8.3367	8.3721	8.4075	8.4429	8.4784	8.5140
23	3.3872	8.8361	8.8722	8.9083	8.9444	8.9806	9.0168	9.0531	9.0894
24	3.7675	9.4186	9.4554	9.4923	9.5292	9.5662	9.6032	9.6402	9.6773
25	4.1722	10.0134	10.0509	10.0886	10.1262	10.1639	10.2017	10.2395	10.2774
26	4.6021	10.6201	10.6584	10.6968	10.7352	10.7737	10.8122	10.8507	10.8893
27	5.0574	11.2387	11.2777	11.3168	11.3560	11.3951	11.4344	11.4736	11.5131
28	5.5388	11.8688	11.9086	11.9484	11.9882	12.0281	12.0681	12.1080	12.1481
29	6.0467	12.5103	12.5507	12.5912	12.6318	12.6724	12.7130	12.7537	12.7944
30	6.5814	13.1629	-----	-----	-----	-----	-----	-----	-----

TABLE IV.—Concluded.

Depth Inches	Correction to be subtracted for two side con- tractions	1 — 2	9 — 16	5 — 8	11 — 16	3 — 4	13 — 16	7 — 8	15 — 16
3	0.0262	0.5245	0.5386	0.5529	0.5672	0.5817	0.5963	0.6110	0.6259
4	0.0574	0.7647	0.7807	0.7968	0.8130	0.8233	0.8457	0.8622	0.8789
5	0.0947	1.0333	1.0510	1.0687	1.0866	1.1045	1.1227	1.1407	1.1590
6	0.1438	1.3275	1.3467	1.3660	1.3853	1.4048	1.4244	1.4440	1.4637
7	0.2057	1.6454	1.6660	1.6866	1.7074	1.7283	1.7493	1.7703	1.7914
8	0.2812	1.9852	2.0071	2.0291	2.0512	2.0734	2.0957	2.1180	2.1404
9	0.3714	2.3456	2.3688	2.3921	2.4154	2.4388	2.4623	2.4859	2.5095
10	0.4770	2.7256	2.7499	2.7744	2.7989	2.8235	2.8481	2.8729	2.8977
11	0.5988	3.1240	3.1495	3.1751	3.2008	3.2265	3.2522	3.2781	3.3040
12	0.7376	3.5403	3.5668	3.5935	3.6202	3.6470	3.6738	3.7008	3.7277
13	0.8940	3.9735	4.0011	4.0288	4.0565	4.0844	4.1122	4.1402	4.1682
14	1.0689	4.4231	4.4517	4.4804	4.5091	4.5379	4.5668	4.5957	4.6247
15	1.2628	4.8884	4.9180	4.9477	4.9774	5.0072	5.0370	5.0669	5.0968
16	1.4765	5.3690	5.3996	5.4302	5.4608	5.4915	5.5223	5.5531	5.5840
17	1.7105	5.8645	5.8959	5.9274	5.9590	5.9906	6.0222	6.0540	6.0857

18	1.9654	6.3742	6.4066	6.4389	6.4714	6.5039	6.5364	6.5690	6.6017
19	2.2418	6.8980	6.9312	6.9644	6.9977	7.0311	7.0645	7.0979	7.1314
20	2.5404	7.4353	7.4694	7.5035	7.5376	7.5718	7.6060	7.6403	7.6746
21	2.8616	7.9860	8.0208	8.0557	8.0907	8.1257	8.1607	8.1958	8.3310
22	3.2061	8.5496	8.5852	8.6209	8.6567	8.6925	8.7283	8.7642	8.8001
23	3.5143	9.1258	9.1623	9.1987	9.2353	9.2718	9.3085	9.3451	9.3818
24	3.9668	9.7145	9.7517	9.7889	9.8262	9.8635	9.9009	9.9384	9.9758
25	4.3840	10.3153	10.3532	10.3912	10.4292	10.4673	10.5055	10.5436	10.5819
26	4.8265	10.9280	10.9666	11.0054	11.0441	11.0830	11.1218	11.1607	11.1997
27	5.2948	11.5523	11.5917	11.6312	11.6707	11.7102	11.7498	11.7894	11.8291
28	5.7894	12.1881	12.2282	12.2684	12.3086	12.3489	12.3891	12.4295	12.4699
29	6.3106	12.8352	12.8760	12.9169	12.9578	12.9987	13.0397	13.0807	13.1218
30	-----	-----	-----	-----	-----	-----	-----	-----	-----

For discharges for depths less than 3 inches, use Tables V or VI. The absolute error will be small.

TABLE V.

DISCHARGE OVER RECTANGULAR WEIRS, WITH AND WITHOUT CONTRACTION.

$$\text{Formula, } D = 3\frac{1}{3} (1 - .2H) H^{\frac{3}{2}}.$$

Depth of Water on Crest		DISCHARGE IN CUBIC FEET PER SECOND							Correction to be ADDED to each of the preceding to give dis- charge with no cont'n
		With two Complete Contractions							
In Inches	In Feet	1 ft. Long	1½ ft. Long	2 ft. Long	3 ft. Long	5 ft. Long	10 ft. Long		
0.3	.025	.0133	.0200	.0267	.0400	.0677	.133	.0000	
0.6	.050	.0369	.0556	.0743	.1116	.1863	.3716	.0004	
0.9	.075	.0674	.1015	.1350	.2040	.3410	.6830	.0010	
1.2	.1	.1033	.1560	.2087	.3132	.5240	1.0519	.0021	
1.5	.125	.1438	.2175	.2912	.4385	.7332	1.4695	.0037	
1.8	.15	.1879	.2847	.3816	.5753	.9627	1.9312	.0058	
2.1	.175	.2355	.3575	.4795	.7235	1.2115	2.4315	.0085	
2.4	.2	.2861	.4352	.5843	.8824	1.4787	2.9690	.0119	
2.7	.225	.3399	.5177	.6956	1.0513	1.7627	3.5412	.0160	
3.0	.25	.3959	.6042	.8126	1.2293	2.0227	4.1462	.0208	
3.3	.275	.4543	.6946	.9350	1.4157	2.3771	4.7803	.0264	
3.6	.3	.5149	.7888	1.0627	1.6104	2.7059	5.4442	.0328	
3.9	.325	.5775	.8863	1.1952	1.8129	3.0482	6.1363	.0401	
4.2	.35	.6420	.9871	1.3321	2.0223	3.4032	6.8537	.0483	
4.5	.375	.7079	1.0909	1.4732	2.2335	3.7691	7.5976	.0574	
4.8	.4	-----	1.1974	1.6189	2.4623	4.1485	8.3645	.0675	
5.1	.425	-----	1.3070	1.7680	2.6926	4.5400	9.1565	.0785	
5.4	.45	-----	1.4189	1.9221	2.9280	4.9404	9.9775	.0906	
5.7	.475	-----	1.5333	2.0790	3.1708	5.3523	10.8094	.1037	
6.0	.5	-----	1.6500	2.2392	3.4177	5.7748	11.6672	.1178	
6.3	.525	-----	1.7689	2.4029	3.6709	6.2069	12.5469	.1331	
6.6	.55	-----	1.8890	2.5698	3.9295	6.6489	13.4474	.1496	
6.9	.575	-----	2.0129	2.7395	4.1928	7.0995	14.3668	.1672	
7.2	.6	-----	2.1378	2.9123	4.4614	7.5596	15.3052	.1859	
7.5	.625	-----	2.2646	2.0881	4.7351	8.0291	16.2641	.2059	
7.8	.65	-----	2.3929	3.2665	5.0133	8.5065	17.2409	.2271	
8.1	.675	-----	2.5234	3.3478	5.2960	8.9930	18.2354	.2495	

TABLE V—Continued.

Depth of Water on Crest		DISCHARGE IN CUBIC FEET PER SECOND					Correction to be ADDED to each of the preced- ing to give dis- charge with NO contr'ion
		With Two Complete Contractions					
In Inches	In Feet	2 ft. Long	3 ft. Long	5 ft. Long	10 ft. Long		
8.4	0.7	3.6313	5.5586	9.4832	19.2497	0.2733	
8.7	0.725	3.8170	5.8747	9.9906	20.2796	0.2984	
9.0	0.75	4.0052	6.1702	10.5007	21.3262	0.3248	
9.3	0.775	4.1961	6.4704	11.0190	22.3895	0.3524	
9.6	0.8	4.3888	6.7734	11.5444	23.4704	0.3816	
9.9	0.825	4.5833	7.0810	12.0769	24.5659	0.4121	
10.2	0.85	4.7806	7.3929	12.6169	25.6779	0.4440	
10.5	0.875	4.9792	7.7075	13.1641	26.8056	0.4775	
10.8	0.9	-----	8.0257	13.7177	27.9477	0.5123	
11.1	0.925	-----	8.3509	14.2839	29.1164	0.5486	
11.4	0.95	-----	8.6731	14.8461	30.2786	0.5864	
11.7	0.975	-----	9.0012	15.4192	31.4652	0.6258	
12.0	1.0	-----	9.3333	16.0000	32.6667	0.6667	
12.3	1.025	-----	9.6685	16.5869	33.8829	0.7091	
12.6	1.05	-----	10.0058	17.1789	35.1109	0.7531	
12.9	1.075	-----	10.3471	17.7777	36.3552	0.7988	
13.2	1.1	-----	10.6907	18.3825	37.6100	0.8449	
13.5	1.125	-----	11.0373	18.9926	38.8801	0.8949	
13.8	1.150	-----	11.3866	19.6080	40.1625	0.9455	
14.1	1.175	-----	11.7388	20.2298	41.4573	0.9977	
14.4	1.2	-----	12.0935	20.8569	42.7664	1.0516	
14.7	1.225	-----	12.4507	21.4893	44.0866	1.1073	
15.0	1.25	-----	12.8109	22.1279	45.4204	1.1646	
15.3	1.275	-----	13.1733	22.7713	46.7653	1.2237	
15.6	1.3	-----	13.5375	23.4189	48.1224	1.2846	
15.9	1.325	-----	13.9067	24.0727	49.4927	1.3473	
16.2	1.35	-----	14.2740	24.7308	50.8733	1.4117	
16.5	1.375	-----	14.6450	25.3946	52.2671	1.4780	

TABLE V—Concluded.

Depth of Water On Crest		DISCHARGE IN CUBIC FEET PER SECOND		
		With Two Complete Contractions		Correction to be AD- DED to each of the preceding to give discharge with NO contraction
In Inches	In Feet	5 feet Long	10 feet Long	
16.8	1.4	26.0625	53.6710	1.5460
17.1	1.425	26.6355	55.0870	1.6160
17.4	1.45	27.4122	56.5122	1.6878
17.7	1.475	28.0950	57.9515	1.7615
18.0	1.5	28.7814	59.3999	1.8371
18.3	1.525	29.4719	60.8584	1.9146
18.6	1.55	30.1675	62.3290	1.9940
18.9	1.575	30.8681	63.8116	2.0754
19.2	1.6	31.5727	65.3042	2.1588
19.5	1.625	32.2809	66.8059	2.2441
19.8	1.650	32.9935	68.3185	2.3315
20.1	1.675	33.7093	69.8393	2.4207
20.4	1.7	34.4269	71.3710	2.5120
20.7	1.725	35.1546	72.9146	2.6054
21.0	1.75	35.8827	74.4662	2.7008
21.3	1.775	36.6151	76.0286	2.7984
21.6	1.8	37.3520	77.6020	2.8980
21.9	1.825	38.0709	79.1614	3.0196
22.2	1.85	38.8341	80.7716	3.1034
22.5	1.875	39.5812	82.3717	3.2093
22.8	1.9	40.3321	83.9816	3.3174
23.1	1.925	41.0860	85.5995	3.4275
23.4	1.95	41.8436	87.2271	3.5399
23.7	1.975	42.6045	88.8635	3.6545
24.	2.0	43.3665	90.5061	3.771
27.	2.25	-----	107.44	5.06
30.	2.50	-----	125.16	6.59
36.	3.00	-----	162.79	10.39

TABLE VI.

DISCHARGE OVER CIPPOLETTI'S TRAPEZOIDAL WEIR OF VARIOUS LENGTHS AND WITH VARIOUS DEPTHS, AND OVER RECTANGULAR WEIRS WITHOUT SIDE CONTRACTION.

$$\text{Formula, } D = 3.3\frac{2}{3} L H^{\frac{3}{2}}.$$

Depth of Water on Crest		DISCHARGE IN CUBIC FEET PER SECOND						
In In.	In Feet	1 ft. Long	1½ ft. Long	2 ft. Long	3 ft. Long	4 ft. Long	5 ft. Long	10 ft. Long
0.3	.025	.0135	0.0202	0.0269	0.0404	0.0539	0.0673	0.1347
0.6	.05	.0367	0.0566	0.0754	0.1131	0.1508	0.1885	0.3771
0.9	.075	.0690	0.1035	0.1380	0.2071	0.2761	0.3451	0.6902
1.2	.10	.1064	0.1596	0.2128	0.3192	0.4256	0.5319	1.0639
1.5	.125	.1488	0.2232	0.2976	0.4464	0.5952	0.7440	1.4881
1.8	.15	.1956	0.2934	0.3912	0.5868	0.7824	0.9780	1.9560
2.1	.175	.2464	0.3697	0.4929	0.7393	0.9858	1.2322	2.4644
2.4	.20	.3010	0.4515	0.6020	0.9029	1.2039	1.5049	3.0098
2.7	.225	.3592	0.5388	0.7184	1.0777	1.4369	1.7961	3.5922
3.0	.25	.4208	0.6312	0.8417	1.2625	1.6833	2.1041	4.2083
3.3	.275	.4855	0.7282	0.9709	1.4564	1.9419	2.4273	4.8547
3.6	.30	.5531	0.8297	1.1063	1.6594	2.2126	2.7657	5.5314
3.9	.325	.6238	0.9358	1.2477	1.8715	2.4954	3.1192	6.2384
4.2	.35	.6972	1.0459	1.3945	2.0917	2.7890	3.4862	6.9724
4.5	.375	.7730	1.1595	1.5460	2.3190	3.0920	3.8649	7.7299
4.8	.40	-----	1.2777	1.7035	2.5553	3.4071	4.2588	8.5177
5.1	.425	-----	1.3993	1.8658	2.7987	3.7316	4.6645	9.3290
5.4	.45	-----	1.5246	2.0328	3.0492	4.0656	5.0820	10.1640
5.7	.475	-----	1.6534	2.2045	3.3067	4.4089	5.5112	11.0225
6.0	.50	-----	1.7854	2.3805	3.5708	4.7610	5.9512	11.9025
6.3	.525	-----	1.9210	2.5614	3.8420	5.1227	6.4034	12.8068
6.6	.55	-----	2.0599	2.7465	4.1198	5.4930	6.8663	13.7326
6.9	.575	-----	2.2018	2.9357	4.4036	5.8715	7.3393	14.6787
7.2	.60	-----	2.3472	3.1293	4.6939	6.2585	7.8231	15.6463
7.5	.625	-----	2.4955	3.3274	4.9911	6.6548	8.3185	16.6370
7.8	.65	-----	2.6462	3.5283	5.2924	7.0565	8.8206	17.6413
8.1	.675	-----	2.8007	3.7343	5.6014	7.4686	9.3357	18.6715

TABLE VI.—Continued.

Depth of Water on Crest		DISCHARGE IN CUBIC FEET PER SECOND					
In In.	In Feet	2 Feet Long	3 Feet Long	4 Feet Long	5 Feet Long	7 Feet Long	10 Feet Long
8.4	0.7	3 9437	5.9156	7.8874	9.8593	13.8030	19.7186
8.7	0.725	4.1565	6.2347	8.2930	10.3912	14.5457	20.7824
9.0	0.75	4.3733	6.5599	8.7466	10.9332	15.3065	21.8675
9.3	0.775	4.5942	6.8912	9.1883	11.4854	16.0796	22.9708
9.6	0.80	4.8177	7.2265	9.6354	12.0442	16.8619	24.0885
9.9	0.825	5.0453	7.5679	10.0906	12.6132	17.6585	25.2264
10.2	0.85	-----	7.9154	10.5538	13.1923	18.4692	26 3846
10.5	0.875	-----	8.2669	11.0225	13.7781	19.2893	27.5562
10.8	0.90	-----	8.6234	11.4978	14.3723	20.1212	28.7446
11.1	0.925	-----	8.9850	11.9800	14.9749	20.9649	29.9499
11.4	0.95	-----	9.3516	12.4688	15.5860	21.8204	31.1720
11.7	0.975	-----	9.7233	12.9644	16.2054	22.6876	32.4019
12.0	1.00	-----	10.1000	13.5667	16.8333	23.5667	33.6667
12.3	1.025	-----	10.4808	13.9744	17.4679	24.4551	34.9359
12.6	1.05	-----	10.8666	14.4888	18.1110	25.3554	36.2220
12.9	1.075	-----	11.2575	15.0100	18.7624	26.2674	37.5249
13.2	1.10	-----	11.6524	15.5365	19.5206	27.1888	38.8412
13.5	1.125	-----	12.0513	16.0684	20.0855	28.1198	40.1711
13.8	1.150	-----	12.4553	16.6071	20.7588	29.0624	41.5177
14.1	1.175	-----	12.8644	17.1525	21.4406	30.0168	42.8812
14.4	1.2	-----	13.2764	17.7019	22.1274	30.9784	44.2548
14.7	1.225	-----	13.6936	18.2581	22.8226	31.9517	45 6453
15.0	1.25	-----	14.1148	18.8197	23.5246	32.9344	47.0492
15.3	1.275	-----	14.5410	19.3880	24.2349	33 9289	48.9699
15.6	1.3	-----	-----	19.9603	24.9503	34.9305	49.9007
15.9	1.325	-----	-----	20.5394	25.6742	35.9439	51.3484
16.2	1.35	-----	-----	21.1238	26.4047	36.9666	52.8095
16.4	1.375	-----	-----	21.7123	26.1404	37.9966	54.2808

TABLE VI.—Concluded.

Depth of Water on Crest		DISCHARGE IN CUBIC FEET PER SECOND			
In Inches	In Feet	Four Feet Long	Five Feet Long	Seven Feet Long	Ten Feet Long
16.8	1.4	22.3075	27.8844	39.0382	55.7688
17.1	1.425	22.9082	28.6352	40.0893	57.2704
17.4	1.45	23.5128	29.3910	41.1474	58.7820
17.7	1.475	24.1242	30.1552	42.2173	60.3105
18.0	1.5	24.7396	30.9245	43.2943	61.8490
18.3	1.525	25.3604	31.7005	44.3808	63.4011
18.6	1.55	25.9866	32.4833	45.4766	64.9666
18.9	1.575	26.6182	33.2727	46.5818	66.5455
19.2	1.6	-----	34.0685	47.6959	68.1370
19.5	1.625	-----	34.8702	48.8183	69.7405
19.8	1.65	-----	35.6782	49.9495	71.3565
20.1	1.675	-----	36.4913	51.0878	72.9826
20.4	1.7	-----	37.3111	52.2355	74.6222
20.7	1.725	-----	38.1376	53.3926	76.2752
21.0	1.75	-----	38.9691	54.5568	77.9383
21.3	1.775	-----	39.8074	55.7304	79.6149
21.6	1.8	-----	40.6515	56.9121	83.3030
21.9	1.825	-----	41.5009	58.1013	83.0018
22.2	1.85	-----	42.3577	59.3008	84.7154
22.5	1.875	-----	43.2179	60.5031	86.4358
22.8	1.9	-----	-----	61.7211	88.1730
23.1	1.925	-----	-----	62.9442	89.9203
23.4	1.95	-----	-----	64.1720	91.6743
23.7	1.975	-----	-----	65.4116	93.4452
24.0	2.0	-----	-----	66.6560	95.2228
25.5	2.125	-----	-----	72.999	104.289
27.0	2.25	-----	-----	79.541	113.63
28.8	2.4	-----	-----	87.619	125.18
30.0	2.5	-----	-----	93.156	133.07

Chapter IX.

RESERVOIRS, COUNTY BOUNDARIES, ROADS AND BRIDGES.

RESERVOIRS.

The Chaffee county, Custer county and Monument creek reservoirs have been completed during the past two years and accepted. The Saguache reservoir is nearly completed.

Following are the statements of expenditures of each of the four reservoirs:

CHAFFEE COUNTY RESERVOIR.

STATEMENT OF EXPENDITURES.

Appropriation	\$15,000 00
Unexpended balance November 30, 1892.....	14,525 48
J. H. Robinson, engineering and superintendence	\$ 445 60
J. N. Kincade, contractor.....	11,750 00
H. G. Dennison, engineering and superintendence....	193 75
E. J. Hall.....	7 05
R. H. Wells.....	15 00
News Printing Co., printing.....	14 82
R. A. Southworth, superintendence	358 50
Foley Bros., clearing	961 00
Robert Hall.....	49 20
J. W. Moakler, superintendence.....	312 00
Typewriting	5 85
	<hr/> 14,112 77
Balance unexpended	\$ 412 71

CUSTER COUNTY RESERVOIR.

STATEMENT OF EXPENDITURES.

Appropriation	\$10,000 00
Balance unexpended.....	9,714 05
E. J. Hall, engineer.....	\$ 283 95
T. R. Christian, surveyor	575 25
R. A. Southworth, superintendence	45 00
J. L. King, contractor	8,733 16
J. C. Riggs, procuring title to site	20 00
Dana Templin, assistant to engineer.....	30 00
R. M. Hall, assistant to engineer	24 00
	<hr/> 9,711 36
Balance unexpended.....	\$ 2 69

MONUMENT CREEK RESERVOIR.

STATEMENT OF EXPENDITURES.

Appropriation		\$34,000 00
Balance unexpended November 30, 1892.....		33,088 35
H. J. Reid, superintendence.....	\$ 661 00	
D. McShane, contractor	30,528 86	
J. S. Titcomb, deputy state engineer.....	3 00	
Delos Durfee.....	357 00	
State engineer	4 40	
News Printing Co., printing.....	3 55	
Chas. Adams, land damages.....	300 00	
D. McShane, land damages.....	302 50	
El Paso County Herald Company	2 00	
		32,161 81
Balance unexpended.....		\$ 926 54

SAGUACHE RESERVOIR.

STATEMENT OF EXPENDITURES.

Appropriation		\$30,000 00
Balance unexpended November 30, 1892.....		29,486 50
T. R. Christian, surveys and superintendence.....	\$ 1,032 12	
W. E. Dodge, contract.....	25,025 12	
J. A. Wright, superintendence	846 00	
Typewriting	75	
R. A. Southworth, superintendence	197 45	
		27,101 66
Unexpended balance		\$ 2,384 84

The above reservoir is nearing completion at this writing, January 10, 1895.

EL PASO AND PARK COUNTY BOUNDARIES.

A petition for the definite establishment of a county boundary line between the counties of El Paso and Park was prepared at Colorado Springs, April 29, 1893, by the county commissioners of El Paso county, J. C. Plumb, chairman, and duly presented to the state engineer, in accordance with section 771, Mills' Annotated Statutes, it being claimed that said correction of the boundary line was urgently needed.

In accordance with the above petition, during the months of August and September, 1893, a careful survey of the territory was made and boundary lines corrected and distinctly marked by monuments.

Field notes and survey for the same accepted and approved by the state engineer December 16, 1893.

EAGLE AND GARFIELD COUNTY BOUNDARIES.

September 16, 1893, the county clerk forwarded to the state engineer a certified copy of resolutions passed by the board of commissioners of Eagle county, at their special meeting held at Red Cliff, September 15, 1893. The petition stated in substance that the west boundary of the county of Eagle was so indefinite that a portion of territory was claimed by the county of Garfield, and requested that the survey of each county be run out and established on west line of Eagle county, according to the statutes of the state of Colorado, and further fixed and defined by plain and substantial marks, mounds and natural monuments, in accordance with the terms and provisions of section 1 of an act of the General Assembly of the state of Colorado, entitled "An act to provide for the settlement of disputed county boundaries in the state," approved April 4, 1887.

The survey of the above boundary line was correctly executed during the months of October and November, 1893, and, together with field notes for the same, approved and accepted at the state engineer's office, December 16, 1893.

CLEAR CREEK COUNTY ROAD.

"An act to amend section 1 of an act entitled 'An act to build a wagon road in Clear Creek county from a point near the mouth of Train run to Argo mine, and terminate at the Ouida cabin,' approved April 24, 1889," approved April 16, 1891.

During the month of June, 1893, plans and specifications were made out for this road, and bids advertised for. July 8 of the same year the contract was awarded to Wright Barker, as the lowest bidder, at \$3,700.

Final acceptance of road and balance on contract price allowed October 16, 1893.

STATEMENT OF EXPENDITURES.

Appropriation		\$5,000 00
Expended under former administration	\$ 178 31	
Engineering and superintendence.....	673 85	
Printing	21 45	
Wright Barker, on contract.....	3,700 00	
		<hr/>
		4,573 61
Balance unexpended.....		<hr/>
		\$426 39

MONTEZUMA AND DOLORES COUNTY WAGON ROAD.

"An act to aid the counties of Montezuma and Dolores, Colorado, in constructing a wagon road from Dolores, Montezuma county, to Rico, Dolores county, and appropriating \$10,000 therefor," approved April 14, 1891.

At a meeting of the board of construction, held in the governor's office September 7, 1893, the state engineer was instructed to advertise for bids for construction of road, provided he should receive notice from the county commissioners of Montezuma county that they would guarantee to raise \$2,500 to assist the state in building the road. The former board of construction, after careful surveys, data and estimates, had deemed the state appropriation inade-

quate, and later no proposals were received in response to call for bids under plans and specifications submitted by state engineer.

December 11, 1893, in the state engineer's office, the board of construction voted to accept the bid of J. A. McIntyre & Co., of Denver, for the construction of the road, theirs being the lowest of eleven bids received, at \$9,757. The state engineer was further instructed to prepare contract for the state for \$8,300, the balance, \$1,457, to be paid by Montezuma county.

The road was finally accepted July 2, 1894, and the balance due on contract ordered paid.

STATEMENT OF EXPENDITURES.

Appropriation		\$10,000 00
Expended under former administration	\$ 985 12	
E. J. Hall, engineer.....	657 40	
Lillie Callicotte, type-writing.....	3 00	
Advertising and printing.....	52 59	
J. A. McIntyre & Co., contractors	8,300 00	
		<hr/>
		9,998 11
		<hr/>
Total unexpended	\$ 1 89	

BEAR RIVER BRIDGE.

"An act to provide for the construction of a bridge across Bear river, in Routt county, at a point near Marshall Ford, about five (5) miles east of the town of Hayden, and appropriating \$5,000 therefor," approved February 27, 1894.

Early in June, 1894, a call was made for plans and specifications for the above bridge, and on June 25 the plans submitted by The Missouri Valley Bridge and Iron Works were accepted. The final award of contract was made to Messrs. Farnsworth & Blodgett, of Kansas City, Missouri, at \$4,482. The bridge is a steel truss, and consists of two spans of 112 feet each. The roadway is fourteen feet in the clear between the trusses, the contract having been carried out in a most satisfactory manner.

Fully accepted and final payments made December 4, 1894.

REPORT STATE ENGINEER.

STATEMENT OF EXPENDITURES.

Appropriation		\$5,000 00
Engineering and superintendence	\$ 229 20	
Agnes Cummings, type-writing	5 85	
Missouri Valley Bridge and Iron Works, for plans.....	50 00	
Farnsworth & Blodgett, contractors.....	4,594 75	
		<hr/>
		4,877 80
		<hr/>
Balance unexpended	\$ 122 20	

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